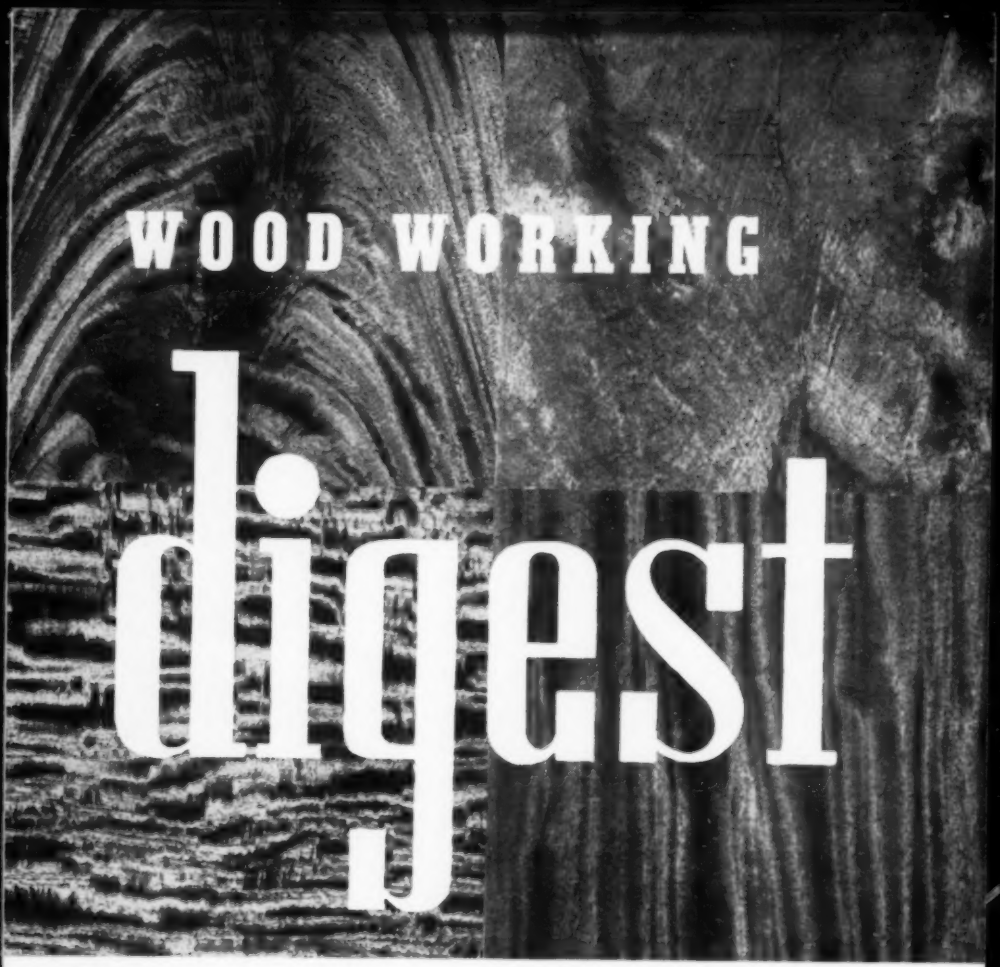


A Hitchcock Publication

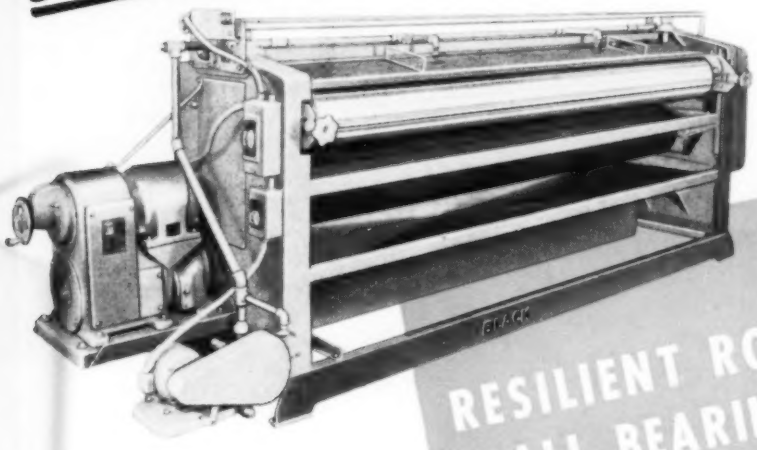
Feature Articles 43-89
Safety Section 95
Finishing Section 107
Veneer & Plywood Section 149

MARCH, 1951

Complete Index 5
Products Index 226
Advertisers Index 228

Unmatched in...

SPEED • ECONOMY • ACCURACY



RESILIENT ROLL BALL BEARING GLUE SPREADER

During the past ten years, Black Bros. have built more resilient roll glue spreaders than all other manufacturers

No. 22D Ball Bearing, Resilient Roll Spreader is by far the finest glue spreader for resins, caseins, and other cold glues on the market today. Gluing rolls are deeply covered with fine synthetic rubber, and are specially grooved to control the amount of resins deposited and to conform to irregularities in the veneer. Accurate, heavy duty ball bearings are sealed to keep lubricants in, and dirt and glue out. Doctor rolls are heavily *coated* with a highly polished, non-ferrous surface to accurately control the glue spread and eliminate corrosion. Write today for supplement to Bulletin 11-A.

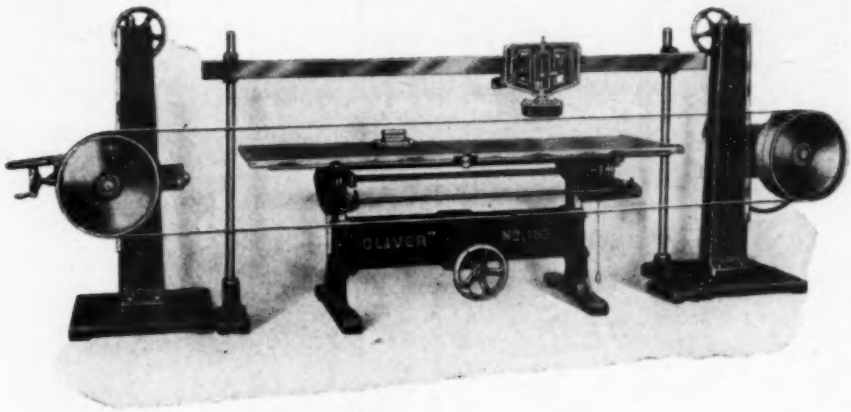
"If It Is Gluing Equipment - We Have It"

BB

THE BLACK BROTHERS CO., INC.

1000 NINTH AVE., MENDOTA, ILLINOIS

"OLIVER" BELT SANDERS



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BELT SANDER

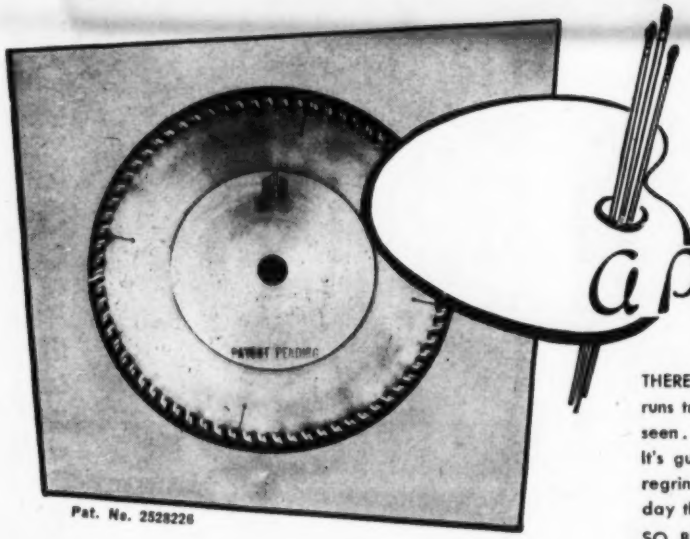
1. A Moulding Sander
2. A fine Flat Sander

With pulleys up it's an excellent Flat Sander; with pulleys down a valuable Moulding Sander. It rapidly sands and polishes line edge mouldings, straight, flat and irregular surfaces. Ideal for sanding and finishing built-up pieces of furniture of small and medium size. Has unlimited usefulness in the small shop as well as the large production plant.

For full details write for illustrated Bulletin 183-D

This "Oliver" Belt Sander is illustrated with semi-automatic sanding attachment. Power stand has motor mounted directly on main slide. Pulleys and table adjustable vertically. Idler pulley also adjustable horizontally. Table rolls on ball bearings.

OLIVER MACHINERY COMPANY
Established 1890
GRAND RAPIDS 2, MICHIGAN



Pat. No. 2528226

A Perfect Work Of Art

YOU DON'T HAVE TO BE an art critic to know that a Big Four carbide tipped blade is a perfect work of art. You may not be interested in what this revolutionary blade has done for others, but you *should* know what it can do for you.

IF YOU HAVE chip-out trouble, if blades over-heat or if distortion plagues you; if your blades fail to duplicate after regrinding, if you get poor factory service and are charged excessively for regrinding; if you're forced to use costly jointing prior to glueing, or if any other problem irritates you then we know you are NOT a Big Four user.

THERE'S NO DISTORTION because it's non-tensioned . . . blade runs true at any speed. It's the smoothest cutting saw you've ever seen . . . there are no chipouts to mar its perfect, smoothly cut edge. It's guaranteed to duplicate its perfect performance after every regrind. On regrinds, blades are ground and returned the same day they are received.

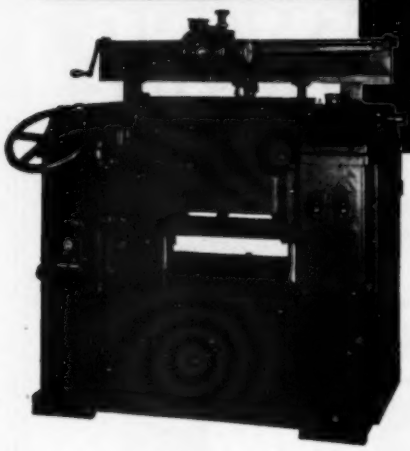
SO, BIG FOUR IS NOT just another saw . . . stamped out and carbide tipped. Instead, it is carefully *turned* out of steel, precision fitted and designed for your job. This effort on our part guarantees you perfect peformance in any cutting operation. Yes, a Big Four blade is a perfect work of art.

FREE LITERATURE will be sent you upon request. Write today: Big Four Carbide Tool Co., Dept. SL-1, 5938 Carthage Ave., Cincinnati 12, O.

BIG FOUR CARBIDE TOOL COMPANY

5902 CARTHAGE AVENUE • CINCINNATI 12, OHIO

DIVIDEND DESIGN gives the PORTER 405 SURFACER 5 Big Advantages



- HIGHER SPEED OPERATION
- PREMIUM CAPACITY
- FASTER ADJUSTMENT
- EASIER OPERATION
- LONGER LIFE

Because of Dividend Design, a Porter 405 Surfacer will handle more lumber at lower cost than ordinary machines. Its extra margin of speed, capacity and strength produces heavier cuts, smoother work and a more profitable operation.

DIVIDEND DESIGN makes the Porter 405 Surfacer extra fast for surfacing at higher speeds. A matched "V" belt drive rotates the cutterhead at 6,000 RPM to assure clean, smooth, perfect work. This high speed is made practical by the newly designed chipbreaker which keeps the machine running free at all times.

DIVIDEND DESIGN permits heavier cuts on a Porter 405 Surfacer. Free and easy cutting action makes possible the use of an increased blade angle without increasing the size of the motor. This means greater surfacing capacity with no rise in power costs.

DIVIDEND DESIGN simplifies adjustment of a Porter Surfacer. The operator quickly varies the rate of feed even as the lumber moves through the machine.

DIVIDEND DESIGN makes it easier to surface pieces of many different sizes and shapes. Individual magnetic controls prevent operation of the feed unless the cylinder is running. All rolls are power driven.

DIVIDEND DESIGN prolongs the life of a Porter Surfacer. It has the extra strength and extreme rigidity of welded steel, ribbed construction. This provides a durability achieved only with excessive weight with cast iron.

Write today for complete information on the advantages of Porter **DIVIDEND DESIGNED** *machinery*

C. O. PORTER Machinery Co.

668 Front Ave., N. W. Grand Rapids 4, Michigan

BEACH SWING CUT-OFF SAW

$395. F.O.B. FACTORY

TABLE $195.00 EXTRA

WRITE FOR FREE FOLDER

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BEACH

MANUFACTURING CO. • MONTROSE, PA.

Wood Working Digest

MARCH, 1951 — OUR FIFTY-THIRD YEAR

The Editor's Page 35
Pointed Paragraphs 37
Furnace-type Lumber Dry Kiln 43
By O. W. Torgeson & H. S. Smith
Gluing Technique for Wood 59
By Thomas D. Perry
Woodwork Preservation 73
By John G. Hammond
Modern Fasteners, Screws and Rivets 81
By Ned Bailey
Know Your Wood—Red and Sweet Gum 89
By Ned Bailey
Preventing Fires in Woodworking Establishments 95
By J. T. Babcock
Hot Spraying of Lacquer 107
By James A. Bede
Drum Sanding Techniques 125
By Mark Hoeper
New Literature 131
Comparative Steam Losses in Dry Kiln Buildings 139
By John B. Welch
F.P.R.S. Clinic 143
Veneer, Plywood and Laminated Wood Section 149
Plastic Surfaced Douglas Fir Plywood and Uses 151
By John D. Ritchie
Veneer and Plywood 165
By Ned Bailey
Manufacturing Processes at the Ipik Plywood Co. 171
Industry Notes 181
Equipment and Supplies for the Woodworking Industry 187
Mechanics Through the Ages 204
The Market Place 206
Wood Working Digest Buyer's Service 210
Products Index 226
Index to Advertisers 228

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RESORCINOL-PHENOLIC
RESIN GLUE
BC-17613

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ON RESORCINOL-PHENOLIC WATERPROOF GLUE BC-17613

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This waterproof liquid adhesive is formulated to provide utmost durability for exterior plywood, laminated lumber, beams, trusses, ships' keels and wherever high strength must be combined with resistance to the elements.

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For complete technical data on BAKELITE BC-17613 waterproof, liquid resin glue, send for your free copy of the special booklet today! Mail us the attached coupon.

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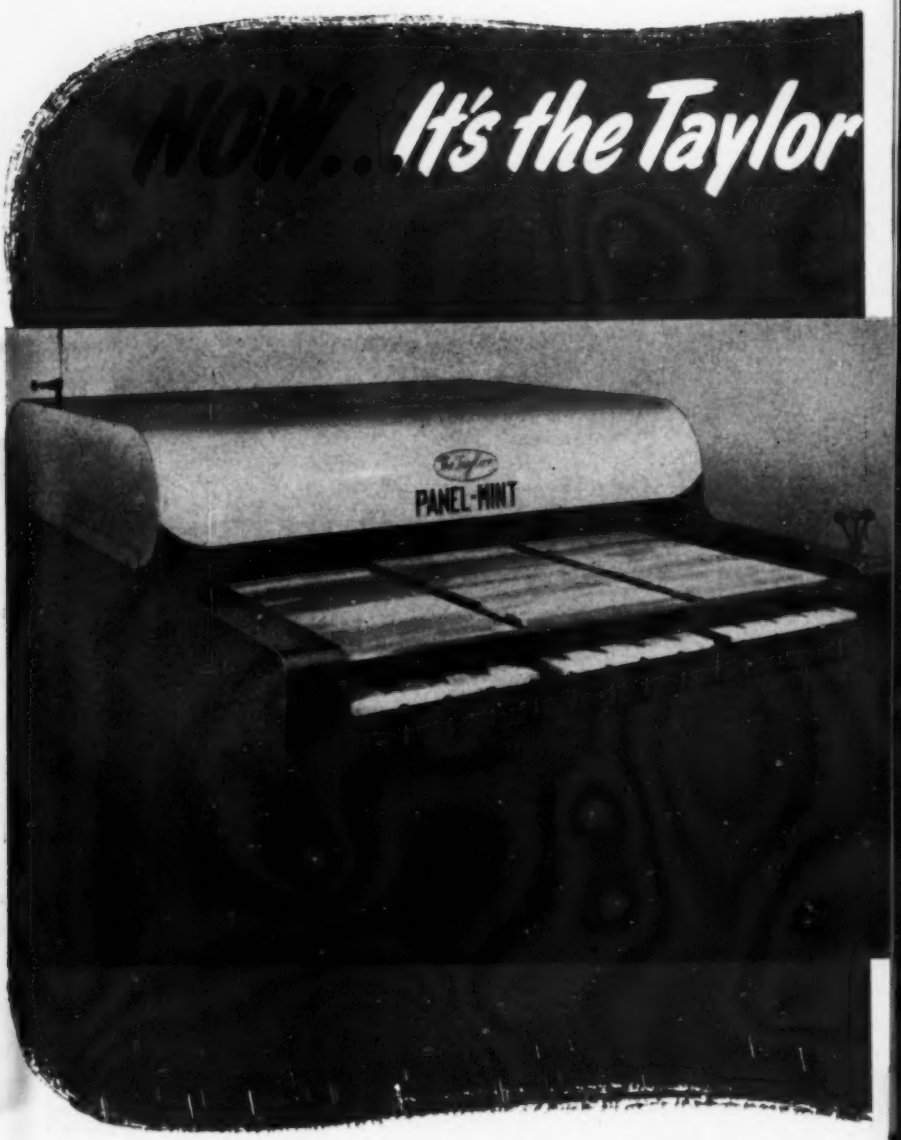
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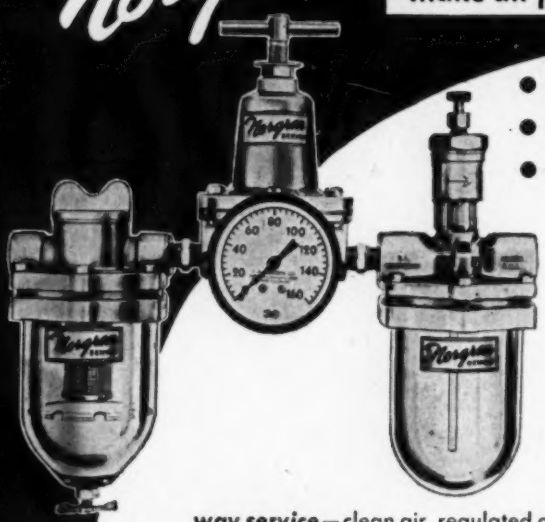

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The Woodworking Industry can take a tip from Metal—where hundreds of thousands of Norgren units, for 25 years, have boosted output, cut maintenance costs and lengthened the life of air-powered equipment.

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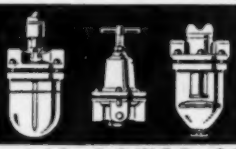

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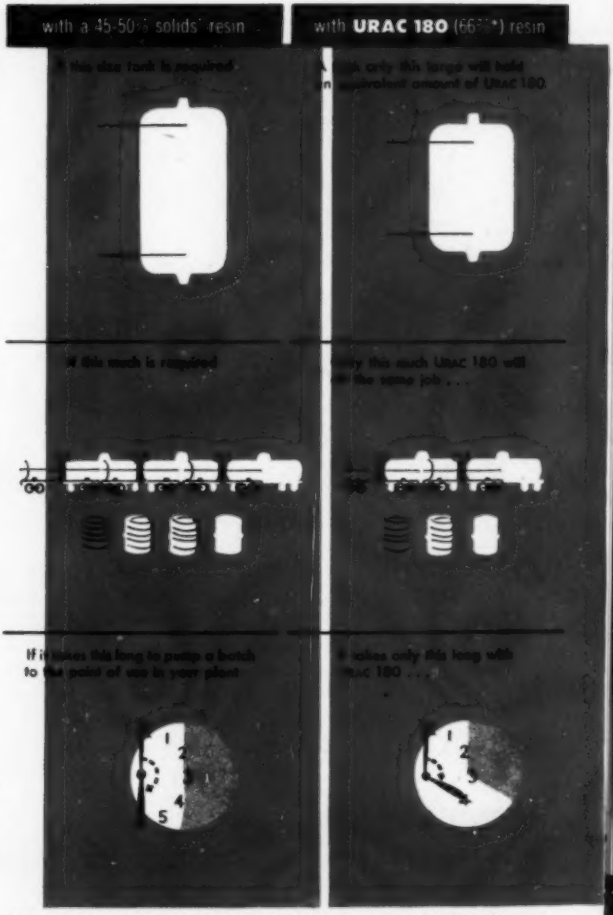
with a 45-50% solids* resin
with URAC 180 (66%*) resin
of this size tank is required
this much is required
If it takes this long to pump a batch to the point of use in your plant
this much URAC 180 will do the same job . . .
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VERSATILITY

STABILITY

QUALITY BOND

If you'd like to investigate further the advantages of buying and using URAC 180 in bulk, our Technical Service Department will be glad to help. We have a booklet that tells more about this versatile resin, too. Just ask for it!

And you get these extra advantages built right into URAC 180

By simply changing the hardener you use with it, URAC 180 can be used for all these jobs:

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URAC 180 is a high-solids urea resin solution which is just as stable . . . often more stable . . . than many a low-solids type.

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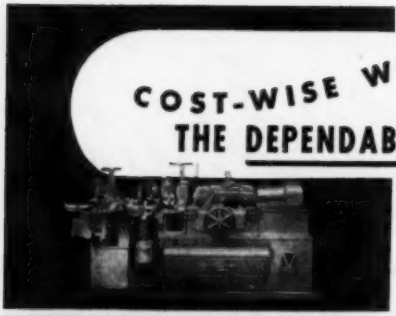
COST-WISE WOODWORKERS KNOW

THE DEPENDABLE Diehl LINE



If you make

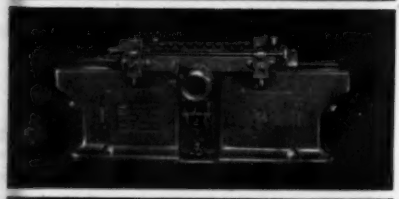
veneer . . . plywood . . . mouldings

fine furniture . . . dimension

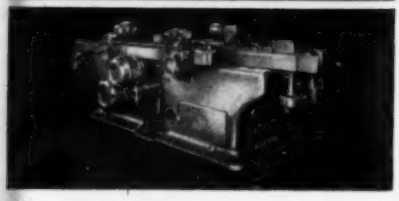
Call in your Diehl representative for facts and figures on the savings made with these and other Diehl woodworking machines. Ask him for specifications on the machines to fit your requirements—or write the factory.

Diehl-Vonnegut Moulder (upper left) — This is the famous 6" and 8", 4-head all-purpose Diehl-Vonnegut, with the vibrationless, trouble-free spindle, found only in Diehl-Vonnegut Moulders. Other sizes range up to 12", both four-and five-head models.

No. 750 Rip Saw — The unequaled rip saw for precision cutting and sawing of open end or hollow glue joints at up to 250 feet per minute. Handles stock from ⅛" up to 4¼", any length. Companion models include the Model 55, and the Junior size, Model 33.



No. 890 Tapeless Veneer Splicer — This fast, economical method of edge joining veneers, without the use of tape, in a neat, invisible splice, is an exclusive Diehl process. Little or no sanding necessary. Speeds up to 85′ per minute.



No. 660 Jointer and Edge Moulder — A double-purpose machine, with only a few minutes change-over required from cutting glue joints to cutting edge mouldings. Workmanship is unsurpassed. Speeds up to 100′ per minute.

No. 69 Veneer Jointer and Edge Gluer — Clean, sharp, straight joints permitting perfect splices, plus the application of glues in the same operation are yours with the G. M. Diehl Model No. 69. Precision accuracy up to 50′ a minute with mixed widths of veneer strip in bundles up to 2" thick.

Also: Edge Gluing Machines, Cutters and Cutterheads, Cutter Grinders, Cut-off Saws, Saw Sets, Glue Pots and Conveyors.

On the Banks of the Wabash

THE G. M. Diehl MACHINE WORKS, INC.

WABASH, INDIANA • U.S.A.

1960

Year after Year . . . .

1965

SMOOTH, ACCURATE DOUBLE SURFACING . . . . WITH THE

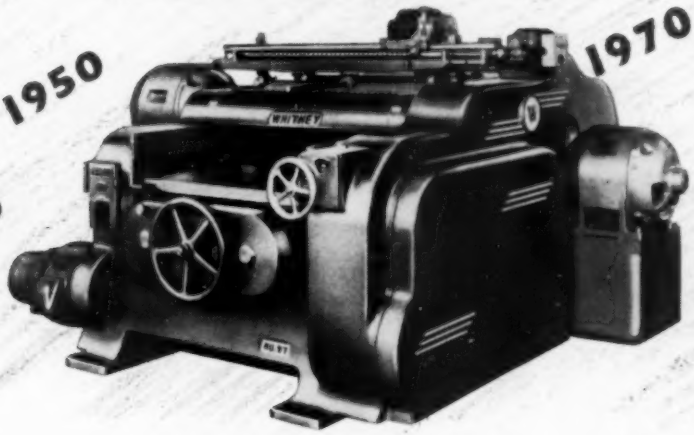
WHITNEY 97

1955

1950

1970

1945



Year after year, woodworking manufacturers have been looking for planing equipment to give them increased production and smoother surfaces at lower costs. And year after year the Whitney 97 Double Surfacer has been producing smooth, accurate double surfacing at faster feeds and at substantial savings in time and materials. The quality of construction and rugged design of the 97 make for a finer accuracy of finish and dependable low cost performance.

With high labor and materials costs, isn't it time you investigated the Whitney 97 Double Surfacer for reducing costs in your plant? Send for Bulletin D3.

Feeds, 30 to 90 feet per minute at touch of handwheel. Planes stock 1/16" to 7" thick. Power raising bed mechanism with fine hand adjustment. Automatic self-reversing Knife Grinder. Sizes, 34", 36", 40" and 44".

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MILWAUKEE
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FIRST and ONLY
RADIAL SAW that
CUTS MITERS 0° TO 90°
RIGHT AND LEFT!
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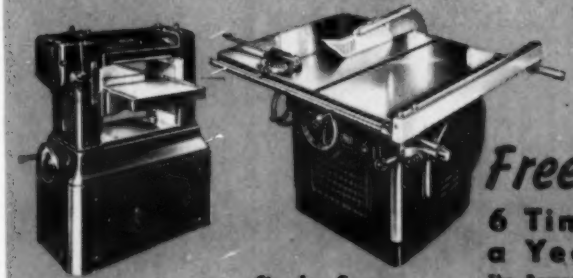
Every machine in Delta's complete woodworking line is built to deliver extra profit-making output. That's why so many woodworking plants are Delta-equipped. Make yours a Delta shop. Send for details on these high-quality, low-cost machines.

Band Saws 14"-20"-36"

Drill Presses 14"-17" — 144 models

Jointers 6"-8"



Planers 13"—24"

Circular Saws 8"-10"-12" — tilting-arbor or tilting-table

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the world's most complete woodworking line

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W-65

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PATENT PENDING

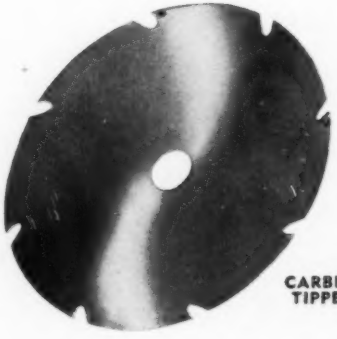
TAKES THE DANGER OUT OF CIRCULAR SAWING

This sensational new PTI "Cut Control" blade not only eliminates all "kick-backs" from circular sawing—but actually cuts smoother, faster and easier. Operates on entirely new cutting principle. Actual tests show it effects power savings of up to 40% and more. Now used and approved by leading industrial concerns, woodworking plants, government departments.

SOLID TOOTH Vanadium Steel

TESTED AND APPROVED

The PTI Cut Control Saw Blade is the first and original blade of this type. It was developed by one of the world's foremost saw manufacturers—and then thoroughly tested in the leading shops and laboratories of Europe and America for more than two years. It is the first saw blade of this kind tested by the Forest Products Laboratories, Madison, Wis., Timber Engineering Company, Washington, D. C., the University of Zurich, Switzerland, and other testing laboratories with favorable reports issued in every instance.



CARBIDE TIPPED

Only the Original **PTI** *Safety Saw Blade offers these exclusive advantages:*

1 Complete Safety From "Kickbacks"—Since the teeth are only 20/1000" high—they cannot grab the wood and throw it against the operator—eliminating one of the most serious causes of circular saw injuries.

2 Reduced Direct Injuries—Cut Control teeth do not drag the hand into the saw. The non-cutting edge acts as an effective stop to cuts and limits their depth.

3 Cuts Chips—Not Sawdust—Unique cutting action produces chips. Easier to clean. Eliminates fire hazard of spontaneous combustion.

4 30% to 40% Power Saving—Fewer teeth mean fewer cuts to achieve same results—hence less power consumption.

5 Longer Life Without Sharpening—When cutting off chips—the wedge action of the tooth does most of the work—which means less wear on the cutting edge of the teeth.

6 More Effective Cutting—Each tooth is backed up better against the body of blade. It is therefore more rigid, less likely to vibrate—and cuts more smoothly.

7 Quieter Running—Fewer teeth makes saw practically noiseless when running true.

8 Blade Does Not Crack—Blades are made of special Vanadium Steel. In addition—controlling of cut prevents overloading of teeth, a common cause of blade cracking.

SEE YOUR DEALER FOR DEMONSTRATION

See your dealer today . . . ask for a demonstration. Be sure to insist on the genuine PTI Safety Blade. If he cannot supply you—order direct. Prices are for special Vanadium Steel blades, combination rip and cross cut, delivered, postpaid.

Here are the prices and sizes, delivered, postpaid. All blades are combination rip and cross cut.

SOLID TOOTH BLADES

7" diameter blade	$ 4.95
8" diameter blade	5.90
10" diameter blade	7.50
12" diameter blade	9.40
14" diameter blade	11.40
16" diameter blade	14.00

CARBIDE TIPPED BLADES

8-TOOTH

7" diameter blade	$41.00
8" diameter blade	42.00
10" diameter blade	43.00
12" diameter blade	44.00

12-TOOTH

10" diameter blade	$49.00
12" diameter blade	50.00
14" diameter blade	51.00
16" diameter blade	52.00

PTI

INCORPORATED

401

BROADWAY

NEW YORK 13, N. Y.

PTI INCORPORATED WWD-3
401 Broadway, New York 13, New York

Gentlemen: Rush me the following units:

Quantity	Blade No.	Blade Bore

Please check:

.....Money order or check for $.....

.....Send C.O.D.

Name.....

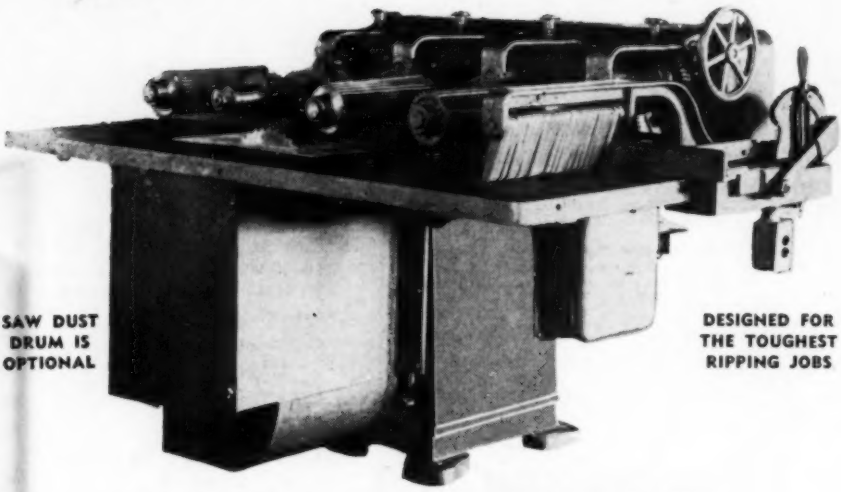
Address.....

City.....Zone.....State.....

Canadian Distributor: The Preston Woodworking Machinery Co., Ltd., Preston, Ontario, Canada

A REAL HUSKY...

NO. 213 A MODERNIZED HOOSIER SELF FEED RIP SAW



SAW DUST DRUM IS OPTIONAL

DESIGNED FOR THE TOUGHEST RIPPING JOBS

FOR QUICK OPERATION - DEPENDABLE PERFORMANCE

This sturdy unit is designed specifically for high speed ripping of stock longer than 24" and as a gang ripper for stock as short as 12". The No. 213 is equipped with a stationary table top having all feed works brackets bolted to the top—as is the gear reduction drive. The mandrel rides on ball bearings and is raised and lowered quickly by a hydraulic cylinder. Eight driven rolls feed the stock through the saw at high speed. A 50 H. P. motor drives this unit at full capacity. The No. 213 is a real workhorse, built to handle your toughest jobs.

Available for direct motor or V belt drive.

SINKER-DAVIS *Company*

230-250 SOUTH MISSOURI ST. DEPT. 0 INDIANAPOLIS, INDIANA

Here's Latest Information on room-temperature bonding with Penacolite® Adhesives

the original resorcinol-formaldehyde adhesives

● Resorcinol base adhesives are the only known resin adhesives capable of curing at *room temperature* which are truly waterproof and, due to their neutrality, are not injurious to cellulosic fibres. No corrosive catalysts are necessary with resorcinol adhesives. They are thermo-setting resins and attain their cured state through an irreversible chemical reaction. The bonds produced with Penacolite Resorcinol Adhesives will not deteriorate with age. Further, because resorcinol resins are insoluble and chemically inert, these adhesives resist attacks by molds, fungi, bacteria, and insects.

Room-temperature setting Penacolite Resorcinol Adhesives are highly recommended for the bonding of all cellulosic materials, most of the thermo-setting and thermo-plastic materials, as well as natural and some synthetic rubbers. With wood, these durable adhesives remain as strong as the material they join . . . over all conditions of temperature from −40°C. to temperatures which actually char wood!

For information on Penacolite Adhesives, send for the following literature:

Bulletin C-O-145 on PENACOLITE ADHESIVE G-1131 (for general assembly bonding)

Bulletin C-O-148 on PENACOLITE ADHESIVE G-1124 (for gluing of oak and other woods having large rays)

Bulletin C-O-143 on PENACOLITE ADHESIVE G-1215 (for general bonding, where economy is paramount)

KOPPERS COMPANY, INC.

Chemical Division, Dept. WWD-3, Koppers Building, Pittsburgh 19, Pa.

KOPPERS

PENACOLITE RESORCINOL ADHESIVES

Atlas 10" TILT/ARBOR FLOOR SAW

EASIER, MORE ACCURATE SAWING AT Lower Cost!

WITH TWO EXTENSIONS

$231.50

F.O.B. KALAMAZOO, LESS MOTOR
(SUBJECT TO CHANGE WITHOUT NOTICE)

Basic Saw, without grill extensions
$191.00

Bigger in table size, distance from blade to fence, in-feed table surface, and depth of cut . . . faster to use with the quick-set, lift-off, double-locking rip fence, and smooth blade controls . . . built throughout with the precision of metalworking tools . . . this Atlas 10" saw is ideal for intermittent or production sawing. Ask your Atlas jobber or dealer for full particulars on all the outstanding features including:

- Precision-ground table 27½" deep x 20" wide 27½" x 59½" with extensions
- Cuts to center of 60½" panel
- 13" table surface ahead of blade
- 3¼" depth of cut
- Quick-set rip fence, locks both ends —Vernier control for fine adjustment
- Sealed-for-life ball bearings.

WRITE FOR FREE CATALOG

ATLAS PRESS CO.

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Atlas ATLAS PRESS CO. Atlas POWER KING ATLAS PRESS CO.

MATCHED PRECISION TOOLS FOR WOODWORKING AND METALWORKING

Green Lumber MAKES FINE BOOMERANGS

. . but

they're supposed to come back!

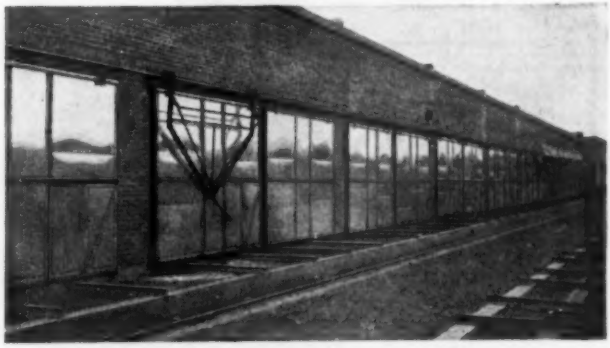
• In these days of higher operating costs, it's more important than ever to stop "boomerang losses" commonly known as "green lumber rejects!"

Make sure! Standard's world-famous dry kilns, with their internal fan construction and automatic reversible cross recirculation, are your safest assurance of better, more uniform drying results. For new kiln installations, or for remodeling old natural draft type kilns to eliminate waste and finished product "boomerangs" rely on STANDARD to solve *your* problem BEST!

•

World-famous Lane cedar chests get their start in this fine battery of 20 Standard Kilns at the Lane Company's big Altavista plant. In addition Lane has ordered and twice reordered Standard Kilns for their Smyrna, Tennessee, plant.

•



Manufacturers of Internal Fan Kilns

Write for illustrated Standard Catalog.

STANDARD

Engineers and Manufacturers Since 1917

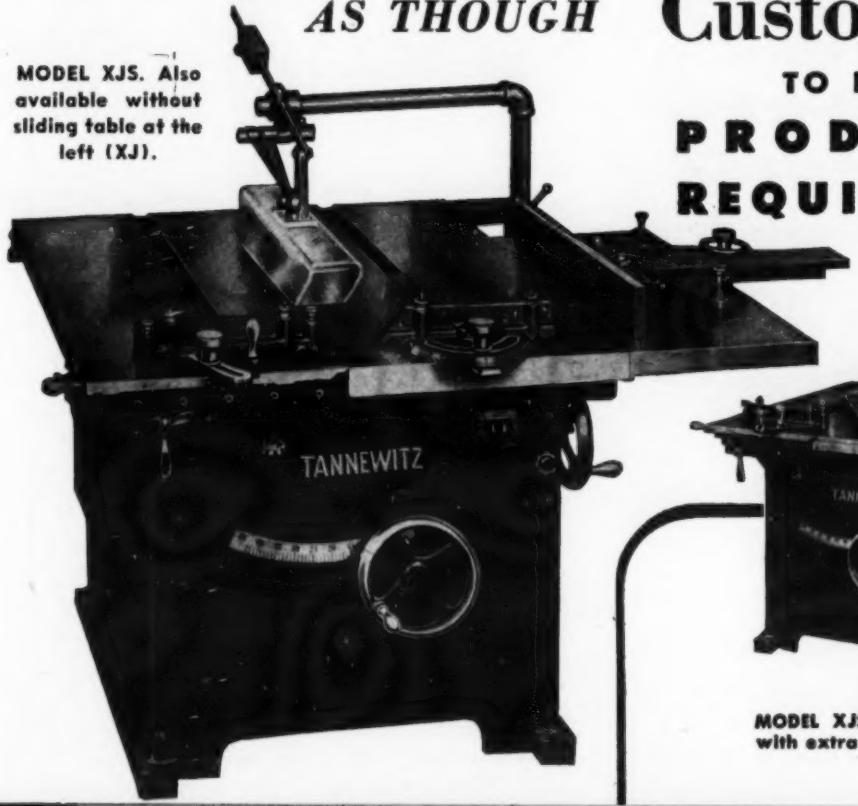
DRY KILN COMPANY

P. O. BOX 5708 • INDIANAPOLIS, INDIANA

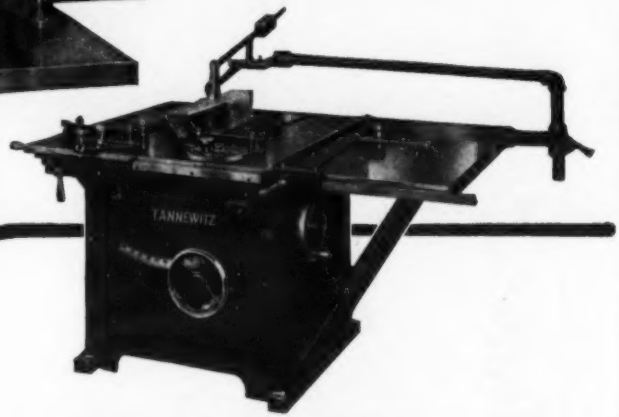
AS THOUGH **Custom Built**

TO FIT YOUR

PRODUCTION REQUIREMENTS



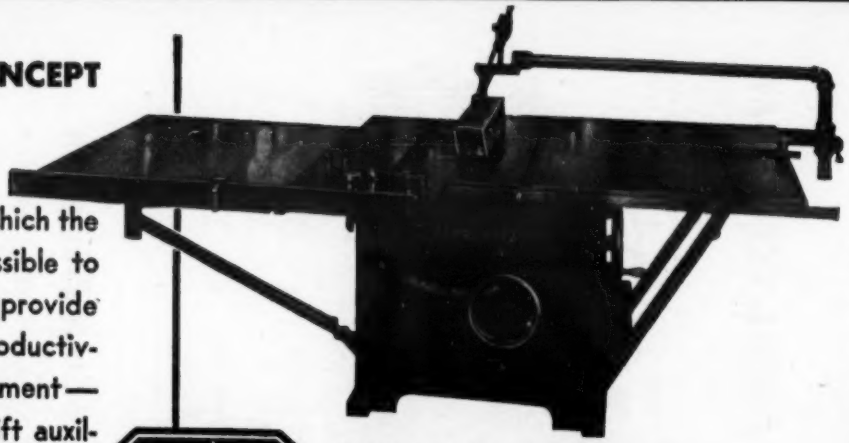
MODEL XJS. Also available without sliding table at the left (XJ).



MODEL XJSW. Same as XJS, but with extra large table at the right.

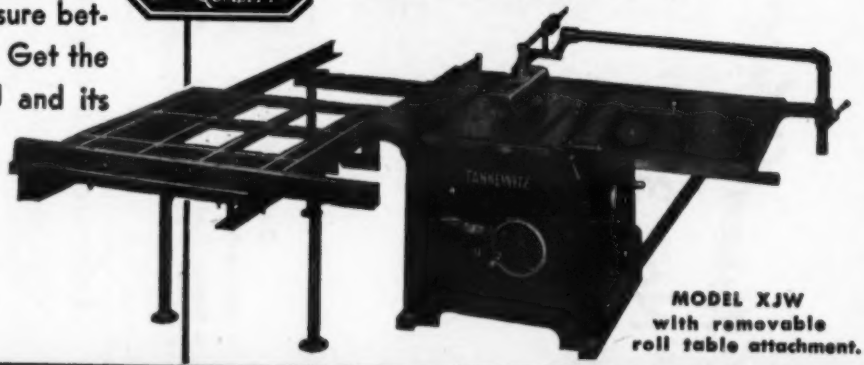
A NEW AND BETTER CONCEPT IN MITERING EFFICIENCY!

With the five different tables with which the Type XJ is available, it is now possible to obtain the exact machine which will provide the maximum of convenience and productivity for every kind of mitering requirement—one that will do away with make-shift auxiliary tables and awkward working conditions, that will step up production and insure better work . . . all at moderate price. Get the complete facts concerning the XJ and its variations. It's entirely unique in the mitering field . . . Tannewitz quality throughout for a lifetime of perfect service. Simply ask for "Bulletin XJ".



Tannewitz QUALITY

MODEL XJSW with removable extended sliding table at the left.

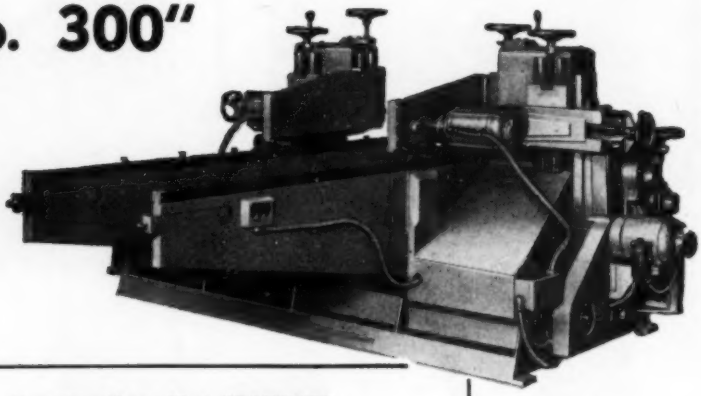


MODEL XJW with removable roll table attachment.

THE TANNEWITZ WORKS GRAND RAPIDS, MICHIGAN

Mereen-Johnson DOUBLE CUT-OFF SAW

"No. 300"



Outstanding M-J FEATURES

- Welded Steel Construction
- Snap-On Feed Dogs
- Rubber Block Hold-Downs
- Hi-Speed Motors
- Variable Feed Drive

Extreme Accuracy in Large Scale Production

"Continuous accurate work at high rates of feed . . . and with a minimum of operating and maintenance cost." That's what production men say about the streamlined Mereen-Johnson Double Cut-Off Saw.

Here are a few points to consider: All controls are grouped at the operator's natural feeding position . . . individual chain beam adjustment motor with easy reading tape dial . . . built-in hand wheels for quick changes.

A range of sizes is offered to meet different working conditions. The No. 300 can be equipped with regular or hi-speed cope motors, stationary or jump dado arbor or other accessories as required for particular production problems.

Write for Circular No. 300

Mereen-Johnson MACHINE COMPANY

4401 LYNDALE AVENUE NORTH • MINNEAPOLIS 12, MINNESOTA

Our prices are right . . . deliveries as YOU want them.

Our technical staff is busy . . . but NEVER *too* busy to take on an interesting adhesive problem.

Today's not too soon to join the enthusiastic thousands who look to National Casein for their glue supplies —casein and resin.

In fact, "Casie" and "Resie" join in close harmony to remind you that our customers are happy customers. They are ever eager to welcome YOU in.

An inquiry incurs no obligation. Write the office nearest you.

National Casein
COMPANY

No Glue Problem— Casein or Resin—is too Little, too Big, or too Tough!

605-19 West 80th Street, Chicago 20, Illinois • Broad & Fulton Sts., Riverton, New Jersey

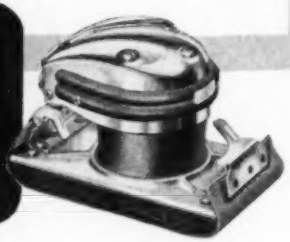
NATIONAL SANDERS

lightweight - sturdy - vibrationless

National offers a selection of air or electric driven sanders with either straight-line or orbital action. These sanders have been carefully developed and tested in the field, and each is the finest machine of its type on the market. Whether you are rubbing the finish coat, padding in filler, sanding in the white, or doing any one of many finishing operations, you will find National Sanders will speed the work and improve the finish. See your National distributor, or write us for descriptive literature.

ORBITAL OR STRAIGHT-LINE ACTION

MODEL 300
TWO-PAD STRAIGHT-LINE AIR-DRIVEN



MODEL 400
ORBITAL ACTION—AIR-DRIVEN

AIR OR ELECTRIC DRIVEN

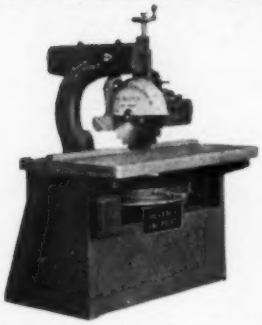
MODEL 500
ELECTRIC—ORBITAL ACTION

NATIONAL NS SANDERS

Write for details today!

NATIONAL AIR SANDER, INC.
2820 AUBURN ST., ROCKFORD, ILLINOIS

MONARCH MACHINES
Designed for Profitable-Production!



MONARCH UNI-POINT RADIAL SAW
MODEL X36-AF

Revolutionary in performance, speed, accuracy and safety. Exclusive Uni-point principle means that the saw blade always enters the wood at the same point in the table, regardless of the cross cut angle. Increases man-hour production by 25%.

20" HEAVY-DUTY BAND SAW
MODEL 72-B

Has every modern feature for precision heavy-duty production. Fully guarded ball-bearing wheels, ball-bearing roller guides, positive saw aligning and tensioning device. Direct or V-belt drive.

16"-18" TILTING ARBOR SAW BENCH
MODEL X24-B

Accurate and dependable for heavy production. All adjustments, convenient, easy-to-operate and safe. Capacity to 4½". Table 36" x 40". Saw tilts to 45°. 5-7½ H.P. Motors.

20" PLANER
NO 41.

Outstanding, low priced, general purpose planer. Turns out large volume of quality work at low production cost. Capacity 20" x 6". Two speeds: 24 and 36 FPM. 4-knife safety cutter head.

8" BALL-BEARING JOINTER
MODEL X-13

Precision machine for quality work. 3-knife safety head. Steel table lips, guarded front and back. 60" table. Heavy cast-iron floor stand. Tilting fence. Direct drive motor.

Send for literature giving complete details on Monarch Profitable-Production machines.

Manufactured and Guaranteed by

MONARCH

AMERICAN SAW MILL MACHINERY CO.

Quality Woodworking Machines Since 1903

204 MAIN STREET, HACKETTSTOWN, N. J.

"The eye of the master will do more work than both his hands."

—Ben Franklin's Almanac, 1757

Touring thy plant with a critical eye can do more for the health of thy business than a trip to Washington.

—Acme Steel Notebook, 1951

Your management eye needs to be a dozen places at once these days—on supplies, on production, on deliveries and all over your plant to keep efficiency high and morale up.

Your Acme Steel representative is ready to help bring you greater thrift in the use of Acme Steel's flat steel strapping and stitching wire in your packaging, shipping, and materials handling operations. He may be able to suggest more efficient ways to use Acme Steel products and accessories to improve your use of the available supply.

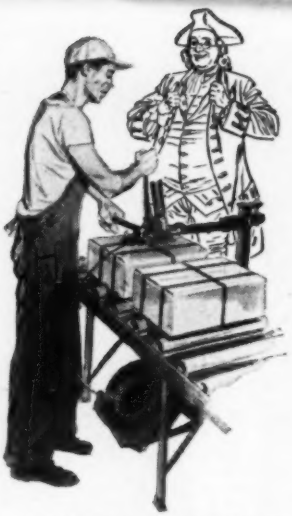
In spite of an increase in productive capacity, U. S. military requirements for some products make it impossible for Acme Steel to meet all the demands of the 50,000 customers, representing nearly every American industry, in these rearming times. But Acme Steel tries to help in every way we can—we always have for more than 70 years.

Information for ready reference on Acme Steel products is available upon request.

ACME STEEL COMPANY

Dept. AL-41, 2838 Archer Avenue, Chicago 8, Illinois

To contact the nearest of our 46 Service Offices in the United States and Canada, check your telephone directory, or write us.



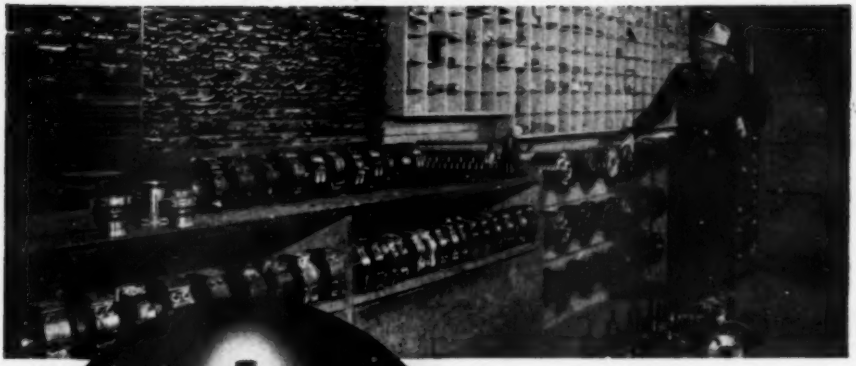
5 things you can do to keep your Acme Steel Strapping Tools on the job:

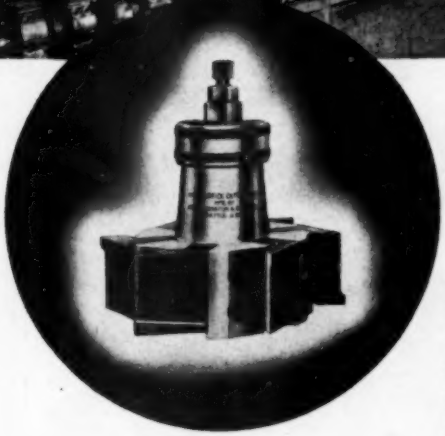
1. Clean and oil every week.
2. Check and clean gripping dogs weekly. Replace when teeth are worn.
3. Detect worn punches and jaws early by checking sealed joints regularly. If in doubt, submit samples, identified by model and serial number, to Customer Service Department, Acme Steel Company.
4. Keep parts list and supply of spare parts handy to make minor repairs. Additional parts lists supplied upon request.
5. Ask us about the Acme Steel "3-WAY SERVICE PLAN" for equipment repairs.

ACME STEEL

Acme Steel Company has enjoyed sound, steady growth under the American business system of open competition. Since 1901 we have made 286 consecutive dividend payments to our stockholders.

ACME STEELSTRAP flat steel strapping and ACME UNIT-LOAD carload bracing BAND, SEALS and TOOLS • ACME SILVERSTITCHERS and ACME SILVERSTITCH WIRE for box stitching • ACME-MORRISON METAL STITCHERS and BOOK STITCHERS • ACME-CHAMPION BAG STITCHERS • ACME HOT AND COLD ROLLED STRIP STEEL • ACME GALVA-BOND steel slat stock for Venetian blinds • ACME STEEL SPECIALTIES, including hoops, corrugated fasteners, nail-on strapping and other container reinforcements • ACME STEEL ACCESSORIES—snips, cutters, punches, tool mounts, reel stands, coil holders, coil trays.





"I've found

DISSTON *Philbrick.* CUTTER HEADS

the best!"

. . . says Si Hannon—a man who really knows cutter heads. He's been in the milling business since 1916; today, he's the owner of Mutual Moulding . . . one of the oldest custom milling plants in Los Angeles. It's of real significance, then, that Si Hannon uses Disston products throughout his plant. In the photo above, you see him with some of the more than 80 Disston Philbrick Heads equipped with Disston Knives used in his operation.

NOW—BETTER THAN EVER WITH *PRECISION-GROUND* BEARING SURFACES! Get better performance—accuracy and working ease! Now, Disston Philbrick Cutter Heads are precision ground—to .0001 (one ten-thousandth) of an inch—on head bores, on inside and outside of sleeves, on all bearing surfaces between the machine spindle and head, insuring more accurate work! You save money by saving downtime!

Grinding precision finish on bore of Disston Philbrick Cutter Head. Machines used for this grinding are the most modern and accurate of their type.

DISSTON PHILBRICK CUTTER HEADS

GENERATED (MILLED TO PATTERN) TYPE

produce more — more efficiently!

Consider the flexibility! Work a wide variety of patterns with each pair of Disston Philbrick head bodies. Knife changes are quick, simple. No holders, clamps, gibe—no trouble. Save manpower, downtime, material!

Longer Life! Disston Philbrick alloy heads are specially heat-treated to last longer!

Faster feeds, heavier cuts! Thicker knives, greater throat room eliminate overloading and clogging with shavings. Heads pull easily—produce smoother work!

For smoother finish, more footage, lower investment and operating costs—DISSTON PHILBRICK CUTTER HEADS!

HENRY DISSTON & SONS, INC.
395 Tacony, Philadelphia 35, Pa., U.S.A.
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HANCHETT

306-B TRIP HAMMER CIRCULAR SAW SET

★ **RAPID**

★ **POWERFULL**

★ **EFFICIENT**

Quick set-up . . . uniform set . . . simple and convenient adjustments . . . every feature designed to make both rip and cross-cut saws cut accurately and smoothly. A Hanchett-built machine which gives outstanding performance that is unexcelled.

Write today for full information. Dept. WWD-31

COVEL SAW SHARPENERS HANCHETT KNIFE GRINDERS

HANCHETT MANUFACTURING CO.

World's Largest Manufacturers of Saw Sharpening and Knife Grinding Machinery

Main Office - Big Rapids, Mich. **West Coast - Portland Ore.**

2 *Strings for your* BOW

Recently we visited a large airplane factory in Kansas. It was difficult to recognize this firm as the same plant visited late in World War II. The entire place had undergone a remodeling program.

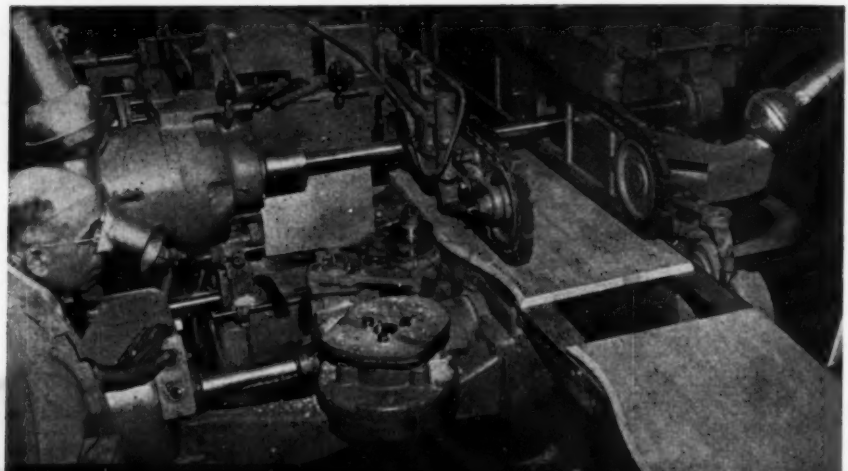
After the war ended, military plane orders had tapered off, leaving the Company with comparatively little need for all of their large plant. Peace time orders for commercial and private planes used some of their production facilities, but there still were space and machinery left for several times the production quota the firm was meeting.

One of the officials who took us through the plant pointed with pride to the assembly line which now had some new equipment, including drying ovens. He explained that when orders dropped off, the Company had found itself with a big plant and heavy maintenance expenses. They decided to get into the manufacture of other products which could be made with much of the same equipment. Furniture seemed to be the answer.

"We called in engineers and furniture designers and they agreed with us. Working together, the group evolved a line of furniture and by re-arranging much of our machinery we went into the furniture manufacturing business. Incidentally, we are making money at it! Our layout is such that we can get back into quantity airplane production overnight. Now we have two strings to our bow!"

How many of our readers can, with some rearranging of their equipment and perhaps some new machines, have "two strings to their bows"—one for war and one for peace?

Ned Bailey
Editor-in-Chief



NOW AUTOMATICALLY PROCESS SERPENTINE AND OTHER IRREGULAR SHAPES

. . . with the GREENLEE No. 545 Double-End Tenoner incorporating the revolutionary new GREENLEE Irregular Shaping Attachment

Again the versatile GREENLEE Double-End Tenoner puts more unusual, time-consuming woodworking operations onto a *streamlined* production basis.

Serpentine edges, hex corners, round corners and various other irregular shapes, such as typical examples shown at right, become a matter of simple, swift *automatic* processing. Operated by an exclusive cam arrangement the new GREENLEE Irregular Shaping Attachment does work precisely, smoothly, speedily.

And to let you quickly "tailor make" cams in your own plant for faithfully producing various shapes of *your own designs,* the GREENLEE is equipped with an easily operated cam-cutting unit.

Now, more than ever, the GREENLEE Double-End Tenoner is "a woodworking plant in itself". For these shaping operations are in *addition* to the many others normally performed by this multi-purpose machine. Write for bulletin. Greenlee Bros. & Co., 1863 Twentieth Avenue, Rockford, Ill.

TOOLS FOR CRAFTSMEN

GREENLEE

GREENLEE WOODWORKING MACHINERY • BORERS • SAWS • TENONERS • PLANERS • SHAPERS • MORTISING and BORING TOOLS

Wood Pointed Paragraphs

"Rod" Cook, writing in the February issue of The Dean Company's "Veneer Newsletter," makes several statements we should consider seriously. "Let me admonish every manufacturer," he said, "of the importance of keeping up quality. Buyers are going to watch you more carefully now than ever before . . . Any manufacturer who did not have a good market (Chicago in January) had better study his line or his methods. The chances are that there is something wrong with either his styles, prices, quality, service or selling. The business is there for those who are properly organized to get it, and handle it."

Friday, February 9, was designated as a day of prayer for the peace of the world. Churches of all denominations in about 100 countries, including our own, held special prayer services. This is one of the many indications of a developing trend to religion. It is interesting to note how we turn to God when we are faced with war, or some disaster strikes us. What have we been doing in the meantime?

Face veneer manufacturers enjoyed one of their best years in 1950. They delivered more than in '49; 35% ahead of '48 and 24% ahead of '47. The seven million TV sets produced were a deciding factor in this remarkable year. The present year will no doubt see a drastic cut in TV set production, however, gradually accelerated government buying will probably off-set the reduction from TV cabinet manufacturers.

Keeping up with consumer and growing government demand for wood products, plus the drain on man power, points to the need for modern equipment to keep up production. Don't wait until it's too late, check your layout and equipment now, and get set for the big push, war or no war, it's on the way.

(Continued on page 40.)

has complete, modern facilities for filling your CUTTERHEAD and KNIFE orders PROMPTLY-ACCURATELY

ORIGINAL

YATES-AMERICAN MACHINE COMPANY
BELOIT, WISCONSIN

DATE _____

TERMS _____

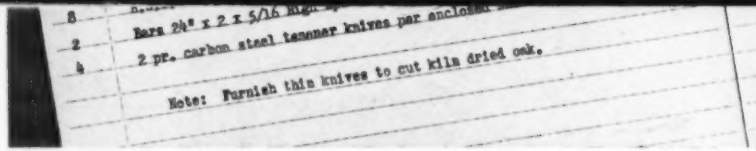
SHIP TO Your Lumber Company
U. S. A.

INVOICE Same

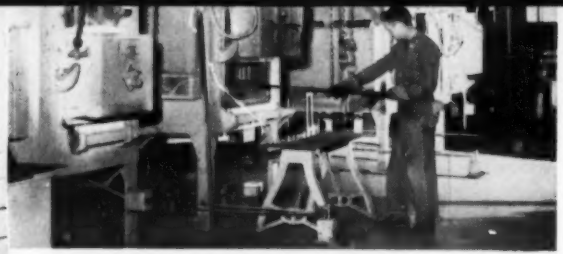
Quantity	DESCRIPTION	PRICE
1 Pr.	1 right and 1 left side head for Moulder #4265, with 6 H.S.S. bits per head to cut pattern per sample	
12	6 right and 6 left H.S.S. milled bits to cut per pattern #2	
8	High Speed Steel slotted thick knives 4 x 4-3/8 slotted 2-1/4 x 5/8. See sketch.	
2	1 pr. slotted shaper knife collars 3" dia. standard slots 2" apart 1-1/4 bore	
	...ar knives 2½ x 1-1/2 x 5/32 ...steel	

A complete record kept of all woodworking machines and parts, enables us to provide the correct cutting equipment for your machine.

Our engineering department is at your service—to select or design the cutting equipment that will do your job best.



Whatever your needs, they can be filled to best advantage with Yates-American heads and knives—either special or standard. Originator of much of the cutting equipment that is now standard in the industry, Yates-American has both the experience and the complete, modern facilities to assure prompt, accurate filling of your orders. Tell us your requirements.



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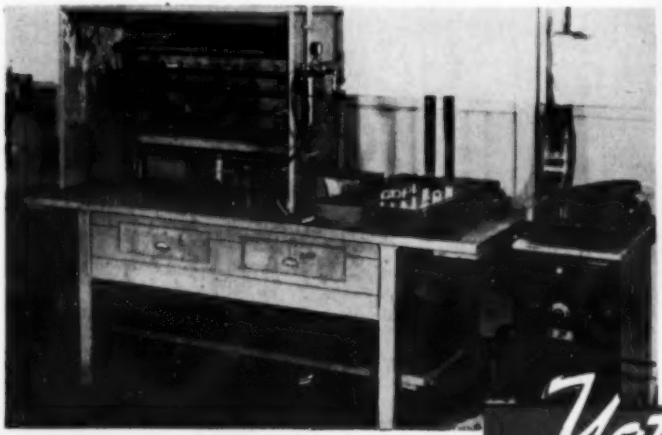

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(Continued from page 37.)

Mahogany is about in balance with the supply, which isn't as happy a situation as it would appear to be. Lack of bottoms to import this wood may have its effect in the very near future.

Some of the popular tropical American species are already nearing the scarce stage. Rift white oak and mahogany crotches are in this group. Fortunately, beautiful sliced walnut is still available.

We again call your attention to the advisability of getting in touch with your local procurement office to find out where and how you can fit into the war effort. It may mean the addition of space or equipment, or both. Find out now, so you won't be sorry later.

Chicago Market dates set through 1953 include June 18-28, 1951; January 7-18, 1952—June 1952 still undecided due to the possibility of a presidential national convention—January 5-16, 1953 and June 15-25, 1953.

Retail furniture dealers generally expect good business throughout the year and do not anticipate any important problems for several months. January sales were far ahead of last year and it looks as though this will continue to be true for the next six months at least.

Heavy buying by retail lumber yards kept the prices of softwood lumber zooming upward until the recent freeze. Evidently the retail lumbermen are more optimistic about home building than the loan people. Another element that helped boost the price was the shortage of logs.

We are pleased that throughout the woodworking industry in general there is a recognition of the fact skimping on quality is false economy. Inferior merchandise, however well camouflaged under an attractive finish, brings little real profit.

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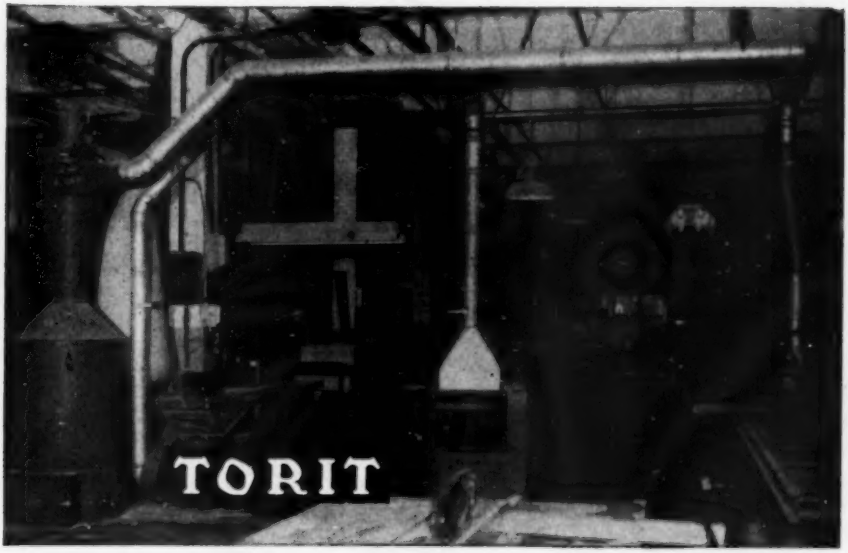

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Note, too, the 15 cubic foot capacity of the storage reservoir of the unit above. Made especially for this service is shows the adaptability of Torit dust collecting equipment to every situation where dust creates a problem.

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BY O. W. TORGESON - H. S. SMITH

Furnace-type Lumber Dry Kiln

DURING World War II, the need for drying facilities increased at small sawmills operated with gas, Diesel engines, or electric power. Such mills lacked steam for the more conventional steam-heated type of lumber dry kiln. Because of the difficulties of control and the increased fire hazard, most of the dry-kiln companies and engineers providing steam kilns had avoided the design and and construction of furnace-type kilns. To learn what could be done about these problems, and to provide information and data on design and operation of kilns of this general type, the Forest Products Laboratory undertook to do some design and test work in this field. The kiln type described in this report is intended for use only where steam is not readily available.

A small experimental unit was built on the Laboratory grounds during the early months of 1944 and was in operation approximately 1 year. The general design did not differ a great deal from conventional steam kilns of the internal-fan, cross-circulation type except in the methods used to supply heat and humidification. A commercial sawdust burner was used in order to utilize a fuel that is considered waste at many mills, but a gas or oil burner or a coal-burning furnace could be substituted. The heating plant also included a secondary combustion chamber and a multiple-return-bend type of smoke pipe which provided the necessary radiating surface. The desired temperature was maintained automatically with a thermostat and a damper motor connected to the draft door of the burner. Relative humidity was controlled automatically with a wood-element hygrostat and a second damper motor. The building itself was of wood and was insulated with dry sawdust. Its capacity was approximately 7,500 board feet of 1-inch lumber. The drying of several northern softwoods and hardwoods, including 4/4 green oak, proved to be satisfactory both as to drying time and drying degrade.

Following this work, a commercial kiln having a capacity four times that of the Laboratory unit was constructed by a Wisconsin lumber company at Merril, Wis., in cooperation with the War Production Board and the Forest Products Laboratory. The kiln has been in continuous operation since February 1945, except for three reconstruction periods when fires damaged portions of the roof and furnace room. These fires were due, at least in part, to the use of dry sawdust and shavings. This fuel burned too vigorously and did not feed properly through the hopper. As there was not a continuous supply of green sawdust, the company decided to replace the sawdust burner with an industrial-type oil burner. Large amounts of northern Wisconsin hardwoods and softwoods have been kiln dried, and the drying results have been good.

A smaller commercial unit, similar in size and design to the Laboratory unit, was built by a firm at Grand Marais,

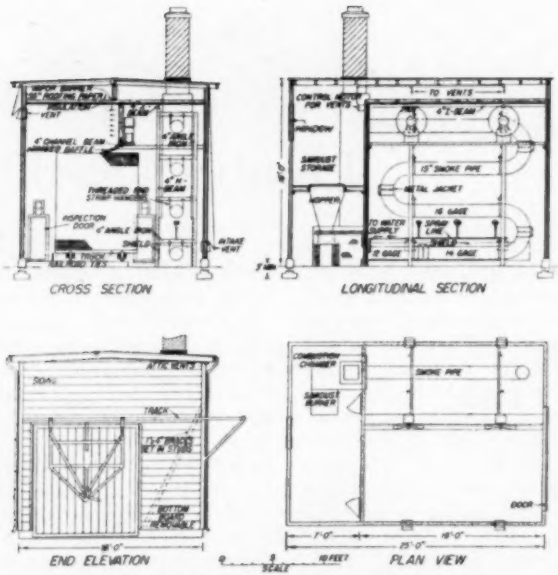

Fig. 1. Improved design of Forest Products Laboratory furnace-type dry kiln.

Minn., and put into operation during June 1946. One fire resulted from an attempt to burn dry sawdust and shavings from a planing mill.

These tests and experiences have indicated that this design is susceptible to good control of drying conditions and that a sawdust burner can be satisfactorily and safely used as long as sawdust that is fresh and of fairly high moisture content is used for fuel. Overheating to obtain high temperatures quickly must be avoided. Consequently, the drying temperatures used must be consistent with moderate demands on the heating equipment, which, of course, is best not only to guard against fire, but also to permit better control of drying conditions. Careful attention in both construction and operation is worthwhile with any kiln operation, but particularly with furnace-type kilns, which require both equipment and technique that are not yet common in this field. Considerable experience is necessary to attain a degree of control comparable to that readily obtainable in a good steam kiln. Therefore, to use the words "cheap" and "inexpensive" too freely in connection with these kilns might be misleading if all factors are not considered. In the light of experience, however, there appears no reason why furnace-type kilns should not serve successfully at many small mills and woodworking shops or plants where steam is not available or where its use would be especially inconvenient and expensive.

Description of Unit

Figure 1 shows a furnace-type kiln design that is similar to the original unit made and tested at the Forest Products Laboratory. Figure 2 is an exterior view showing the door and its hardware, the openings in the eaves

Fig. 2. An exterior view of the experimental furnace-type kiln on the grounds of the Forest Products Laboratory.

that vent the attic space above the insulated ceiling of the drying compartment, and the sticker rack, which can be picked up by a lift truck and moved where needed. Figure 3 shows a burner, and Figure 4 the secondary combustion chamber and the return-bend type of smoke pipe and radiating surface used in the Laboratory kiln.

The commercial sawdust burner used has a grate area of about 4 square feet. It is of a type used rather commonly for home heating in the Pacific Northwest and the Northeastern States. The sawdust is placed in a large hopper and feeds by gravity to inclined grates and horizontal toe grates (fig. 5). The hot gases pass from the adjustable step grates and horizontal toe grates to the combustion chamber, where they are mixed with additional oxygen supplied by the secondary air and are more completely burned. From the combustion chamber, the hot flue gases pass through the long return-bend smoke pipe (fig. 4) to the chimney. The interior of the burner is lined with fire brick, with diatomite insulation between the brick and the cast-iron shell. The fire is controlled by operating the draft door with a small electric motor, such as is commonly used in furnace installations. The motor is set in motion by a bimetallic or gas-operated thermostat that projects through the wall into the drying chamber (on the entering-air side of the load), but is regulated from the furnace-room side.

The general design of this furnace-type lumber dry kiln lends itself to the use of coal, oil, gas, or even wood burners. The most important consideration regarding any burner is its ability to provide a wide range of heat output under good control. Another is its effect on the ultimate cost of drying the lumber.

The secondary combustion chamber has a volume of approximately 25 cubic feet. This volume, approximately 6 cubic feet per square foot of grate area, gives good results, but it is possible that smaller ratios of volume to grate area might also give entirely satisfactory results, particularly when only a low fire is needed. The chamber is

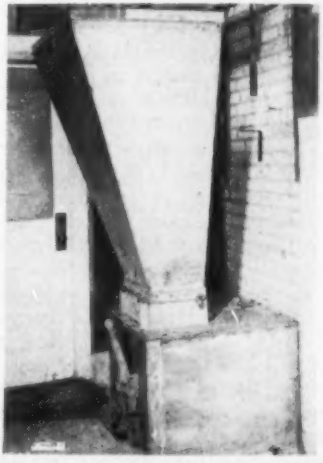

Fig. 3. The commercial sawdust burner used in the Laboratory kiln.

connected directly to the open back of the burner and is also lined with fire brick and insulated. Its exterior is of common brick. The top, consisting of a cement slab cast upon a fire-brick arch, has not proved entirely satisfactory because of the development of cracks due to expansion and contraction. A refractory cement slab could be used in place of the ordinary cement slab and fire brick, but the best top construction would be of regenerator tiles which simply span crosswise of the chamber. Some allowance, however, must be made for expansion and contraction. As originally constructed, the secondary combustion chamber was located within the drying compartment. Since the loss of heat is not great, however, it can be located in the furnace room with only one end projecting slightly into the drying chamber, as shown in figure 1. In this location, it would not interfere with the air circulation through the load, although the amount of interference that occurred was found to be of no great importance.

The combined smoke pipe and radiating surface is 15 inches in diameter and made of 16-gauge metal. The first length from the combustion chamber gets very hot and probably should be of heavier metal. For the first 4 to 6 feet, high-temperature stainless steel would be very good. If desired, the diameter can be adjusted somewhat to conform to standard sheet sizes. Approximately 40 to 50 square feet of radiating surface are believed desirable for each square foot of grate area, but possibly somewhat less would work satisfactorily. The smoke pipe is built in sections, butt jointed together in the center of each bend. A wide metal band with bolted flanges encloses the joint. By enlarging the pipe to get the required amount of radiating surface, the number of runs could be reduced to three, in which case the chimney would be located at the door end of the kiln. The pipes are supported on metal brackets fastened to the vertical angle iron posts. Strap hangers suspended from cross bars (as shown in fig. 1) afford another satisfactory means of support, but, in any case, provision should be made for dismounting the pipes for cleaning.

The brick chimney has an 18-inch square flue lining. A by-pass damper was installed in the chimney for use in starting fires and in controlling the heat within the drying chamber. It was found, however, that the draft was sufficient through the long pipe and that good control of temperature was obtained without using the by-pass. For this reason, it can be eliminated.

In the furnace room a balcony was installed for sawdust storage so as to facilitate the loading of the hopper.

The vent system has dampers for controlling the amount of venting. The dampers are connected to a small motor of the furnace draft-door regulating type, which is set in motion by a wood-element hygrostat employing a micro-type switch for electrical contact. By this means, the evaporated moisture is used to provide humidification. With sufficient attention, hand operation of the vent dampers is satisfactory, but instrument control is more desirable, especially in the initial stages of drying. As constructed in the experimental kiln, a vent duct on one side serves as inlet and one on the other side as outlet. As shown in figure 1, metal ducts pass directly through the side walls of the kiln, eliminating condensation trouble that has been experienced in the furnace room of the experimental unit, where the ducts pass through that room. Two 8-inch diameter pipe vents through each side wall provide sufficient venting capacity for this size of kiln.

The water sprays impinge upwards against the second run of pipe and then drop to the lower pipe. They are

used mainly at the end of the drying period to provide sufficient humidification for the relief of case-hardening stresses; if needed, however, they can be used at other times to increase the relative humidity.

Two direct-connected motor-fan units consist of 1½ horsepower, glass-wound motors and 3-foot, disc-type fans. Each has a rated capacity of approximately 15,000 cubic feet of air a minute at free delivery. The installation provides for reversible circulation, but best uniformity of temperature was obtained with the air passing upwards on the pipe side, and for that reason only one-way circulation is needed. Other types of fan installations can be used, such as disc-type fans mounted on a single longitudinal shaft with the electric motor (or possibly a gas or Diesel engine) located outside the drying chamber, and a special duct enclosing the fans to direct the air through the fans from the heating area to the entering-air side of the load.

The suspended ceiling has 2 by 4 joists and is filled with sawdust for insulation. Fifty-five-pound (per 108 square feet) roll roofing is placed on the lower side of the ceiling joists as a moisture barrier and rests on the 1-inch ceiling boards. The sawdust is left exposed on the top side so that any escaping moisture can pass through it into the ventilated attic space above. The side walls have 2 by 4 studs and are filled with dried sawdust insulation. The inside surface of the studs is also covered with 55-pound roll roofing as a moisture barrier. The roll roofing is put on vertically with overlapping joints sealed together at studs when the inside sheathing was nailed on. For more permanent installations, brick, tile, or light-weight cement blocks are recommended.

The kiln door is 2¼ inches thick, 10 feet, 4 inches wide, and 11 feet high. It is constructed of 2¼-inch solid stiles and rails, ¾-inch braces, insulation, and ¾-inch tongued and grooved boards installed vertically, on both sides. It is mounted on an overhead track with regular kiln-door hardware. A felt strip wrapped in heavy canvas is used as a gasket on the door jamb.

The lumber pile is 8 feet wide, 10 feet high, and 16 feet long. Such a pile will hold approximately 7,500 board feet of full-length, 4/4 lumber piled on ¾- or ⅞-inch stickers. The capacity for random-length, box-piled stock is less and is governed by the average length of the boards. A track system to permit piling the lumber outside the drying chamber on regular kiln trucks is preferable to inside piling on a fixed foundation.

A baffle directs the air to the entering-air side of the load and prevents short circuiting of the air through the fans. It is made of canvas mounted on a frame, and is hinged to the motor platform so that it rests on the top of the load, but is lifted to provide overhead clearance during loading and unloading.

The clear glass tile windows (regular building block material 4 by 7¾ by 7¾ inches in size) are located in the walls above the small inspection doors as a means of reading, from outside, a wet- and dry-bulb hygrometer mounted on the inside wall. A window made with two blocks set vertically gives greater vision than one made with a single block for reading a hygrometer made with long thermometers of the precision type. Caulking compound or other types of mastic that will stand up under high temperatures can be used to seal the joints against vapor leaks.

Operation of Heating System

The method of maintaining the desired dry-bulb temperature in the furnace-type lumber dry kiln is distinctly different from that used in steam-heated

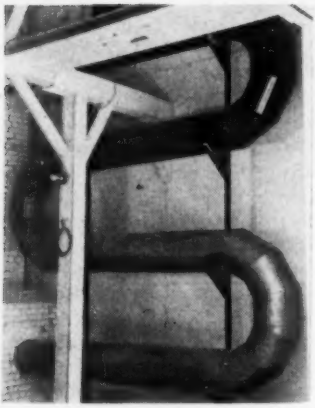

Fig. 4. The return-bend type of elongated smoke pipe that is used for radiation in the Laboratory kiln.

kilns. When operating the latter type, steam is admitted to the radiating system within the kiln by valves manually or automatically operated to maintain the desired temperature. The heat is obtained by using the required amount of steam from a large supply. In operating the furnace-type kiln, the total heat developed by the burner is used at all times and the desired temperature is maintained by controlling the rate of burning. The rate of burning in the sawdust burner used in the Laboratory experimental kiln is extremely flexible and a high degree of control is obtained by controlling the supply of air and fuel.

Conventionally, the fire is started by tipping the hopper forward and laying paper and kindling on the grate before filling the hopper with fuel. An easier method is to fill the bottom of the hopper with dry shavings and light the fire from the ash pit below the inclined grates. The latter method is particularly advantageous if the hopper has been extended upward into a fuel-storage space so that it cannot be readily tipped forward for laying a fire on the grate.

The desired kiln temperature is maintained by the automatic control of the draft door of the burner and by keeping enough fuel in the hopper.

Two devices for governing the amount of air admitted to the burner are the draft door in the front of the burner and the secondary-air port on top of the burner toward the rear. In practice, part of the primary air entering through the draft door may bypass the fuel bed and thus become in effect secondary air.

Primary air is air that passes through the fuel bed. Its volume is controlled both by a thumbscrew adjustment of the draft door that maintains a minimum opening and by automatic opening and closing of the draft door. The temperature is controlled automatically by a thermostat that activates a damper motor through a three-wire, 20-volt electric circuit. As the temperature falls below the setting on the thermostat, the damper motor opens the draft door; when the desired temperature is reached, the motor closes the door. Thus a constant dry-bulb temperature is maintained within the range of heat output of the burner.

The slope of the inclined grates also governs the amount of air that passes through the fuel bed. When the grates are tilted down, less air passes through the fuel bed than when the grates are in a horizontal position. The volume of air that is thus directed is, of course, governed initially by the volume admitted through the draft door.

Secondary air furnishes the oxygen needed to continue the burning of the unburned gases in the combustion chamber. This air enters the burner through a secondary-air port or through the draft door and under or around the grates into the combustion chamber. The supply of air is controlled manually by adjusting the position of the cover of the secondary-air port as well

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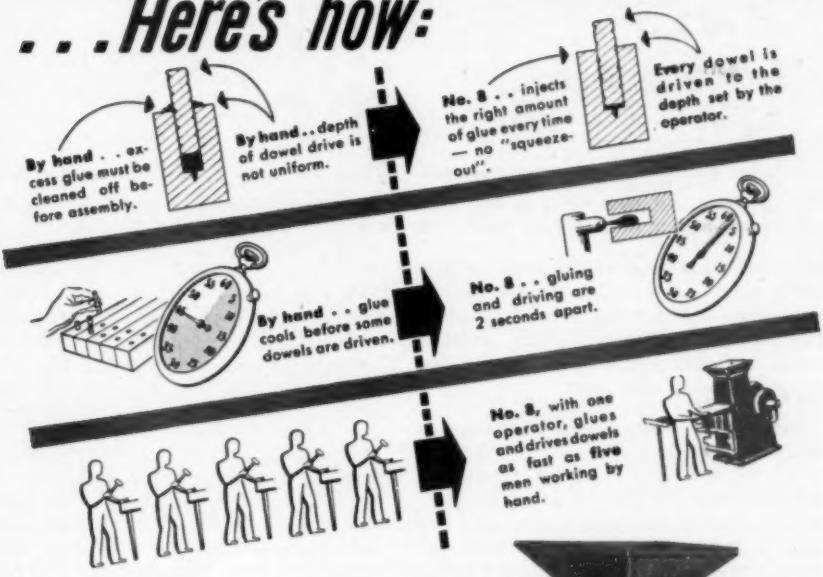
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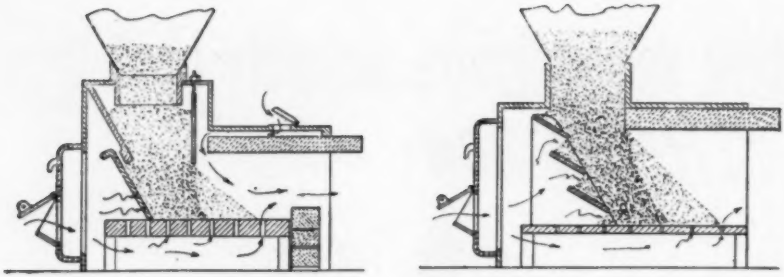

SECTION SHOWING TYPICAL TWO-PIECE FEED GRATE. SECTION SHOWING TYPICAL MULTIPLE SHELF FEED GRATES.

Fig. 5. Cross-sectional views of two typical sawdust burners that are adaptable for use in heating a furnace-type lumber dry kiln.

as by the opening and closing of the draft door. Apparently, the supply of secondary air is seldom more than is required for complete burning, and the secondary-air port may remain open during normal operation.

To hold a desired kiln temperature with the minimum variation, a thumbscrew on the draft door can be manually adjusted to provide a small opening in order to maintain a minimum fire that will nearly furnish the heat required. The size of the opening when the draft door is opened by the electric control motor is then adjusted by moving the point of attachment of the connecting chain along the motor arm, or by leaving much or little slack in the connecting chain when the draft door is closed. The desirable adjustment is to have the rate of burning, when the draft door is open, safely above that required to maintain the desired temperature, but not enough to increase the temperature dangerously. Then, even though the mechanism were to fail, the temperature would not go far below or far above that desired.

Temperature variations recorded in the Laboratory kiln unit while operating under thermostatic control were not great, usually being about 2° F. On occasion, temperature variations were even less, indicating that the burning rate of the furnace as governed by the draft is sufficiently flexible for accurate control between certain temperature limits. The sensitivity of the thermostat seems to be the most important limiting factor.

The adjustments for controlling the depth of the fuel bed on the grate are made by hand, usually only when there is a change in the type of fuel being used. Only a thin layer of a heavy fuel, such as green hardwood sawdust, is required for satisfactory burning; for drier fuel, a thicker layer is required. The fuel baffle is suspended from two threaded studs that extend upward through the top casting of the burner. By turning the nuts on these studs, the baffle is raised or lowered. The angle of the inclined grates also governs the depth of fuel as well as the amount of air that passes through the fuel bed. As the grates are tilted downward, the depth of the fuel bed becomes greater, and as they are tilted back to a horizontal position, the depth of the fuel bed is lessened.

In general, a bed of fuel that is too thick causes much smoke and incomplete burning of the gases in the combustion chamber, while a bed that is too thin allows the draft to rush through

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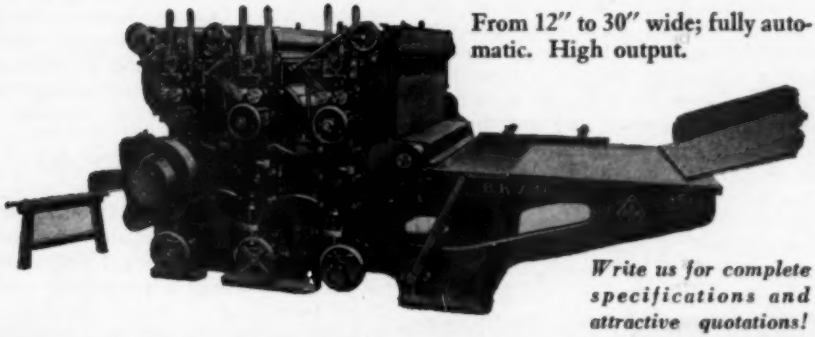

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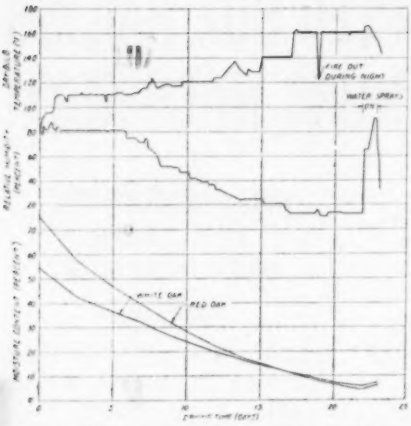

Fig. 6. Drying conditions and resulting drying rate of 4/4 oak from southern Wisconsin, obtained in the Laboratory kiln under full time operation.

the burner, carrying sparks and ash into the combustion chamber. Probably the ideal adjustment is to have the fuel bed as thick as possible while maintaining satisfactory combustion as indicated by the absence of smoke.

Limited experience indicates that the burner can be operated continuously during a kiln run as long as 3 weeks if the ash pit is cleaned out daily or every other day. The amount of ash that accumulates from approximately 700 pounds of green hardwood sawdust during a 24-hour period is less than 0.5 bushel. Between runs, the secondary combustion chamber and the burner are cleaned thoroughly. Approximately 0.4 bushel of ash accumulates back of the grates and in the combustion chamber during 1 week of operation. The removal of this ash presents no special problem. Ash accumulates very slowly in the heating pipe, but occasionally the lower run should be removed and cleaned.

Kinds of Wood Waste Used

Sawdust, shavings, and chips were burned in the Laboratory unit with varying degrees of success. The size, shape, and moisture content of the fuel determine its acceptability. Both have a direct bearing on the heat value of a given volume of fuel and on the manner in which the fuel wil feed down from the hopper into the burner. Granular sawdust feeds much better than either shavings or chips, which, because of their shape and light weight, tend to arch and clog in the hopper. Green or partly dry sawdust has less available heat than dry material because of the amount needed to evaporate the water before it can burn, but, being somewhat heavier per unit volume, it feeds better through the hopper.

During the experimental kiln runs there was no difficulty in holding a fire, even with green oak sawdust. When burning light, dry shavings or chips that do not feed well, the fire burned back into the hopper. Green hardwood or softwood sawdust fed well, burned well, and its heat value was sufficiently high per unit of volume. A mixture of sawdust and shavings or chips burned less satisfactorily as the proportion of shavings or chips was increased. A mixture of 50 percent green sawdust by volume (moisture content 60 to 100 percent based on the oven-dry weight) and 50 percent dry shavings (moisture content 10 to 15 percent) burned fairly well. Oak sawdust having a moisture content of about 40 to 60 percent burned best of the several types of fuel used.

Quantity of Sawdust Fuel Needed

The limited data available on fuel consumption permit only a rough estimate of the quantity required for continuous operation. During 12 kiln runs in the Laboratory experimental unit, 68,150 board feet of lumber were dried. Records of the weight and moisture content of fuel burned and the pounds of water evaporated from the lumber being dried showed that the kiln operates at an over-all efficiency of be-

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The McKnight No. 1-E Saddle Seat Machine cuts six, eight or ten seats per minute. It is the highest speed and most efficient saddle seat machine manufactured. Stock is carried from the hopper to the cutting head by a steel chain. Motor, 10 HP, 3600 R.P.M., ball bearing type. Cutting Head runs at 5000 R.P.M., is mounted in ball bearings. *Write for further details.*

Manufacturers of Combination Horizontal and Vertical Boring Machines — Trimming, Chucking & Boring Machines — Single Drum Sanding Machines — Corner Block Machines — Chair Clamps — Notching Machines — Single End Tenoners — Bending Equipment (including Steam Boxes, Pumps, Benders) — Mortisers.

McKnight Machinery Company

Chair and Woodworking Machinery

GARDNER, MASSACHUSETTS, U. S. A.

tween 15 and 30 percent. This efficiency figure was obtained by dividing the number of British thermal units required to evaporate the water from the lumber by the number of B.T.U. in the fuel burned and includes all heat losses, such as those up the stack and through the building and vents. A wide range of material was dried, including ¾ and 4/4 Western red cedar, 4/4 ponderosa pine, Eastern white pine, Douglas fir, commercial red and white oak, and hard maple. The highest efficiency figures were recorded when drying fast-drying species that had a high original moisture content. The drying time for these species ranged from 3 to 10 days. Small sawmills in one part of the South produced from 0.80 to 0.89 pound of sawdust (oven-dry weight) per board foot sawed,[1] or enough fuel to kiln dry up to 75 percent of all the lumber manufactured.

In burning green, or very nearly green oak sawdust, the burning rate ranged from about 20 to 80 pounds per hour under draft door control and under a draft pressure of about 0.1 inch of water.

Operation of Relative Humidity System

The furnace-type kiln was designed to provide humidification without the use of steam. In steam-heated kilns the desired relative humidity is obtained by maintaining definite dry-bulb and wet-bulb temperatures. The dry-bulb temperature is maintained through control of the steam supply to the heating coils, and the wet-bulb temperature is maintained through control of the steam spray and the vents. In the Laboratory's furnace-type kiln, the desired relative humidity is maintained by automatic control of the vents and a water spray by means of a wood-element hygrostat developed at the Forest Products Laboratory. This instrument is capable of maintaining the desired relative humidity independently of the dry-bulb temperature. It is fairly easy to construct and is capable of controlling relative-humidity conditions within an equilibruim moisture content of wood of approximately 1 percent. In adjusting it to maintain any particular condition, however, an hour or two is required for the wood element to attain the proper moisture content. It is mounted on the wall near the thermostat on the entering-air side of the load (the side opposite the heating pipes).

There are two methods of maintaining the desired relative humidity: (1) by utilizing the moisture from the wood being dried, as is generally done in commercial kilns, and (2) by the use of water sprays to increase the relative humidity of the air. The water sprays are used as are steam sprays in a commercial kiln.

To utilize the moisture given up by the lumber being dried requires that the kiln be as vapor-tight as possible. During the first part of a kiln run, a high relative humidity is necessary to prevent excessive shrinkage of and tension in the surface fibers. If the moisture given up by the wood is more than sufficient to maintain the desired relative humidity, some is exhausted through the vents. As the drying progresses, less and less moisture is extracted from the wood, but, at the same time, a lower relative humidity is desired. This fortunate circumstance makes the control of relative humidity comparatively easy. Especially is this true when drying thin sizes of species that dry readily.

When a higher relative humidity is desired than can be attained by closing the vents to utilize the moisture from

[1] Lotte, Thomas. "Wood waste available for conversion to ethyl alcohol in the Columbia area of South Carolina." Forest Survey Release No. 17, Forest Service, U. S. Department of Agriculture.

...they KNOW Cutter Heads"

Yes, Wisconsin should *know* cutter heads. They've been designing and building cutter head equipment exclusively for more than 25 years . . . in close cooperation with the woodworking industry and its machinery builders. In that time, they have pioneered many of the important developments in this field.

Woodworkers, large and small, have learned that they can count on WISCONSIN for competent counsel on their cutter head problems involving the use of standard or special equipment . . . for old or new machines. The next time you have such a problem, remember to "Ask WISCONSIN".

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Engineers to the Woodworking Industry

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the wood, vapor is added to the air by spraying a fine mist of water upon the hot flue pipes from spray nozzles. A city water supply maintained at a 60-pound pressure gives a fairly fine spray, but pressures perhaps as high as 150 pounds per square inch are more effective. When city water is not available, water can be supplied from a well or driven point by means of a small, automatic, electric pumping unit of the high-pressure type.

Both the vents and the water spray can be operated automatically with an electric control motor through a three-wire, 20-volt circuit and the wood-element hygrostat. During the first part of the kiln run, when there is more than sufficient moisture in the air, the hygrostat circuit is switched to the control motor that operates the vent dampers. In this manner the relative humidity is kept down to that desired by venting the excess. When the moisture given up by the lumber being dried no longer maintains the desired relative humidity, the hygrostat circuit is switched to the control motor that opens the water valve or activates the high-pressure pump, and water is sprayed onto the hot flue pipe, thus increasing the relative humidity to that desired.

Several kiln runs were satisfactorily dried in the Laboratory unit without automatic control of relative humidity. In this moisture-tight kiln sudden changes of relative humidity do not take place as drying progresses. The relative humidity remains steady, slowly falling as less moisture is given up from the wood.

Figure 6 shows the kiln conditions and the drying rate of the lumber for a kiln run consisting of 4/4 commercial red and white oak. During the first 6 days the wood-element hygrostat held the relative humidity to a maximum of 80 percent (except for the first day while the control was being established). Thereafter the vents remained closed and the relative humidity gradually dropped to 10 or 12 percent during the final days of drying. After the lumber had dried to a moisture content of 5 percent, a conditioning treatment for the relief of case-hardening stresses was given the oak by increasing the temperature to 165° F. and the relative humidity to 65 percent for 6 hours by means of the water sprays. As the temperature dropped during the night, the relative humidity increased to 90 percent. This conditioning treatment completely relieved the stresses.

In another kiln run, consisting of 4/4 hard maple, the fans were left on continuously, but the fire was maintained during daylight hours only, and consequently the drying conditions, especially the temperature, varied considerably from the control setting. This is shown in figure 7, which gives the complete drying data for this particular run. These schedules follow, in a very general way, the Laboratory's basic schedules.

Besides the bimetal (or vapor-bulb) thermostat for regulating the temperature, and the wood-element hygrostat for controlling the relative humidity, inexpensive wall hygrometers are used to determine the conditions of temperature and relative humidity. One is placed on each side of the kiln and is visible through the glass-block inspection port above each of the rear access doors. By reading the dry- and wet-bulb thermometers of each instrument, the kiln operator is able to determine the temperature and relative humidity within the kiln, and thus to regulate the drying conditions according to the moisture content of the kiln samples as prescribed by the kiln schedule being followed.

(To be Continued.)

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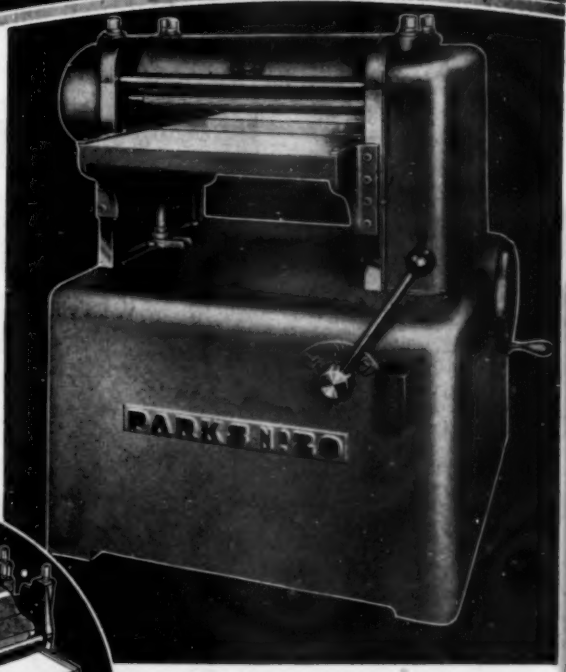

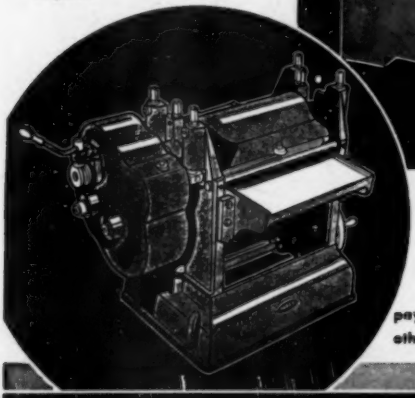

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GLUING

Technique for wood

3. EDGE GLUING FOR VENEERS

BY THOMAS D. PERRY

IN MAKING plywood it is just as important to properly prepare the various veneer layers, as it is to have the lumber cores in suitable condition for gluing. Far more trouble comes from inadequate preparation of the veneers than from poor gluing — whether it be the wrong glue or due to inefficient application methods.

There are two major classifications in preparing veneers, that of (1) face veneers, where attractive appearance is paramount and strength factors are relatively unimportant; and that of (2) utilitarian veneers, where strength and balancing power are essential, while eye appeal is of minor consequence.

Drying and Flattening Veneer

Veneers, face and plain, are customarily shipped and received at about 10% moisture content, below the normal point of mildew and discoloration, and above the point where thin veneer becomes too fragile to handle without breaking.

In subsequent gluing operations the generally recognized standard of moisture content is 5% to 6%, although there are some important exceptions, which can be outlined.

In making Douglas fir plywood the practice is to use the veneer as dry as possible. A moisture content of 3% is the point that is desirable, due to the high solvent ratios of the glues used and the tendency for face checks to develop in hot pressing. However, it is difficult in most factories to hold veneers at this 3% m.c. point, and as a matter of practice it is often somewhat higher.

In using Tego film glue, certain layers like crossbands, which furnish the slight moisture needed to produce the initial flow of the phenolic resin, the proper moisture content is around 7% to 10%. Experience has demonstrated that re-moistening these veneers from 5% up is much more satisfactory than trying to dry down to the 8% to 10% moisture content range required. Spraying or sponging previously dried veneer sheets on one side, and stacking them solid for an hour or two has been found to give excellent results.

Another exception is when using urea resin adhesives which are to be cured at room temperatures and where wood at 5% m.c. is not adequately penetrated, due to the low solvent ratios of the glue mixture. The proper standard for this type of work is approximately 7%, lower is dangerous but it is safe to be slightly higher.

There are two methods in general use for drying and flattening veneers, both face and plain, which are received at around 10% m.c., and are sometimes

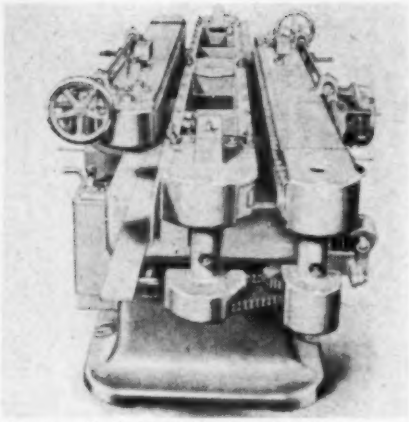
rather crinkly. In the case of fairly flat veneer, as occurs in moderately figured face veneers and in all plain veneers, a platen redrier is the accepted practice. This machine consists of a series of steam heated platens that alternately open and shut to give a "breathing time" for the veneer to shrink as it dries. During the open interval, the charges on the platens are removed and replaced in sequence. It is customary to arrange charges of ¼" thickness in each opening, four sheets of 1/16" veneer, or six of 1/28", being sure they are in reasonable vertical alignment. The elapsed time in the drier depends on the initial moisture content. Usually the charges can be completely changed in 10 to 15 minutes, but for veneer above 12% m.c. a longer time may be required. Moisture content tests should be made from time to time to assure uniform dryness.

In the case of the more crinkled face veneers, the above process is too drastic and might cause serious checking in valuable veneer. This is particularly true of stumps, burls, butts and crotches. Such fragile veneers can be safely flattened by a slower and more moderate process. Arrange a screw clamping press about 36" wide by 72" long and a daylight of some 36". Place a thick (3") stiff head block as a base and provide some 20 caul plates of 4/4 lumber, end cleated and planed smooth. Sprinkle each crinkly veneer with water, or spray with a steam or water hose, until somewhat damp, to render the veneer more pliable and less likely to crack under moderate pressure. Heat the caul plates in the redrier and place one on the base, spread layers of dampened veneer, not over 3/16" thick, in well aligned piles, cover with another hot caul plate, and repeat the process until there is just enough room left for the top head block. After placing this top head block, tighten the clamp screws moderately, and repeat the tightening every 15 minutes for an hour or so, being careful not to crack the veneers. Weighting with "I" beams or bags of sand, may be used in lieu of screw clamps, loading successively and gradually. The heat, moisture and pressure will gradually flatten the softened veneer. Remove veneer from the press after some eight hours or overnight. In some cases it may be necessary to repeat the process, as in extreme cases of crinkling. Usually one treatment is enough. With a bit of experience such fragile veneer faces can be straightened out satisfactorily for cutting. In some instances it may be desirable to put such flattened veneers through the redrier, but usually they will not need it. Tests can be used to indicate the dryness attained in this moderate flattening treatment. The flattened veneers can now be clipped, matched, jointed and taped for laying.

Experienced veneer artisans realize that it is one thing to dry and flatten the veneer to the proper point, and quite another matter to hold it at this point of moisture content until it can be jointed on the edges, spliced together and glued into plywood. There is only one real answer — air conditioned work rooms, and the reason is because thin sheets of veneer are most susceptible to moisture changes from the surrounding atmosphere. This may be particularly troublesome in the transition days in the spring, from steam heated rooms to open windows, and the reverse between autumn and winter. Manufacturers with air conditioned rooms have an assurance of continuous uniformity in the moisture content of their veneers.

Jointing Veneer Edges

The only way to produce a close and almost imperceptible meeting line in face veneers is by snugly fitting the veneers together, edge to edge, without gaps or irregularities. Where the joint is a



Courtesy G. M. Diehl Machine Works

Fig. 1. Rotary head jointer with traveling veneer package.

straight line, as is usually the case, the problem is largely one of the proper mechanical equipment, which requires experienced operators.

When plain veneers are purchased on a dimensioned basis—wholes, halves, thirds and quarters — the jointing of the fractional pieces is usually enough, since jointers can be adjusted to take off all irregularities up to ⅛". When standard size, or random sizes are to be custom cut for a special job, a preliminary clipping is necessary, to rough sizes, leaving enough stock for subsequent jointing.

There are two principal types of veneer jointers; (1) the rotary cutter head machine, sometimes with a double head, employing the preliminary cutter to reduce the amount of the final cut, and improve its quality; and (2) a guillotine shear cut, similar to that of a paper cutter. In all cases, a bundle or package of veneer, some 1" to 4" thick is jogged to an even edge, or arranged by figure alignment, and clamped on the table of the jointer. The entire package is jointed at one operation. In the case of the rotary cutter head jointers, either the head or the veneer package may travel.

In the Diehl type, Fig. 1, the packages of veneer are clamped on edge, between endless chains that provide enough pressure to ensure straight line travel over the cutter. The other edge is jointed on the return stroke, after jogging to the other edge, but over an additional cutter traveling in the opposite direction. If the first cut is insufficient, the veneer package can be put through again.

In the Merritt-Solem type, Fig. 2, the packages of veneer are clamped flat, by pneumatic pressure, on a stationary table. The revolving cutter head

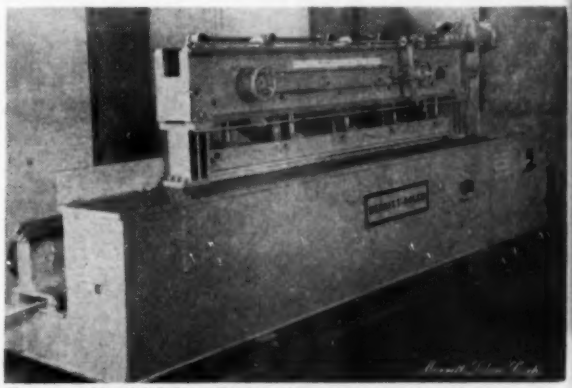


Fig. 2. Traveling head veneer jointer. Cutter head is in the rear but cannot be seen.

Courtesy Merritt-Solem Corporation

Borden's GLUE News

New glues and improvements in woodworking to help you speed production and cut costs

LOW-COST CORE STOCK FROM WOOD WASTE

Save wood and get low-cost core material, too, by converting waste wood to resin-bonded, wood chip Chipcore.

Chipcore replaces solid edge-glued lumber cores, for veneered furniture panels, flush doors and wall panels. Also used as sheathing, roofing base, acoustical panels, linoleum underlay, etc. It's easily glued with resin or casein glue—for veneering, rimming or veneer edge-banding. It's machined and shaped with ordinary woodworking saws and cutters or carboloy-tipped cutters. It does not require planing to provide a good glue bond.

NEW SLAB-WASTE "HARDI-FLOOR" TILES CAN TAKE IT

You can utilize slab waste to make money by going into the "Hardi-Floor" business.

These ¾ in. thick, end-grain "Hardi-Floor" floor tiles are made of glued, sectioned slab waste, then used in 6 x 6 or 12 x 12 floor units. Pre-finished "Hardi-Floor" is reputed to wear longer, lay easier, resist moisture, eliminate cracks, stay stable, be easier to maintain, look better.

It's not patented and is available to any interested concern. Write to J. Hugo Kraemer, Associate in Forestry and Conservation, Agricultural Experiment Station, Purdue University, Lafayette, Ind.

HOW TO HOT-PRESS VENEER TO OAK CORE STOCK

The large pores in oak core stock pick up and hold moisture from extended urea resin glue mixtures, forming steam and causing blisters or loose bonds where the steam escapes. This trouble can be eliminated by using a 30-minute delayed assembly period (CASCO-RESIN No. 5 with Catalyst H-77-L), which allows the glue film to dry to a safe degree before pressing.

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For detailed data on how to qualify in selling wood products to the government, write for free Casco Service Bulletin 82. It gives the complete story, in six concise pages, covering purchasing offices, obtaining bid invitations, estimating glue costs, military specifications and recommended glues to comply.

You reduce resin glue costs when you make Chipcore, as the process utilizes the same urea resin glues used for cold or hot press veneering. This enables you to take advantage of Borden's quantity prices on resin glues. For full Chipcore details, write us for free Casco Service Bulletin 78A.

HOW TO VENEER PINE CORES

To combat trouble in gluing veneers to pine cores with urea resin, cores should be bought unsanded, then sanded within 24 hours of the time they would be veneered. *Results:* Excellent bonds. The reason is that pine and other pitchy woods exude oils and rosins that form a surface coating upon long standing. Fresh sanding leaves the wood more receptive to glue. Pine to be casein-glued doesn't need fresh sanding—the casein glue's alkalinity "cuts" the surface deposits. With urea resin, fresh sanding is a "must."

HOW TO COLD-PRESS HOT VENEERS

The problem: How to avoid precuring when cold-pressing warm or hot veneers that are just out of the dryer? *The answer:* Use a mixture slow enough to prevent precuring — fast enough to give a good bond in reasonable time. *Recommended:* These catalysts (in order of speed, the fastest first)—M-93 or M-95 (depending on type of resin used), H-7 (10 parts), H-7-3 (10 parts).

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Many military wood products demand boilproof glues (JAN-A-397). Hence, CASCOPHEN resorcin resin glue is recommended for scores of assembly operations . . . furniture panel corestock edge-gluing, etc.

By making CASCOPHEN *faster-curing*, many manufacturers maintain normal production with rotary clamps and hot-press edge gluers. Here's how it's done:

Add ½ part Supplementary Liquid Catalyst H-41-L to standard mix of 100 parts CASCOPHEN RS-240M and 20 parts Catalyst FM-124. This cuts pot life, assembly time and pressure period in half. Pot life will meet the minimum of Specification JAN-A-397 (2½ hrs. at 77° F.), pH will also meet Specification (pH of 3.5 to 9). These directions apply to mixtures of CASCOPHEN RS-216, RS-224, LT-67 and RS-240M.

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Address any question on the above data, or any gluing problem, to

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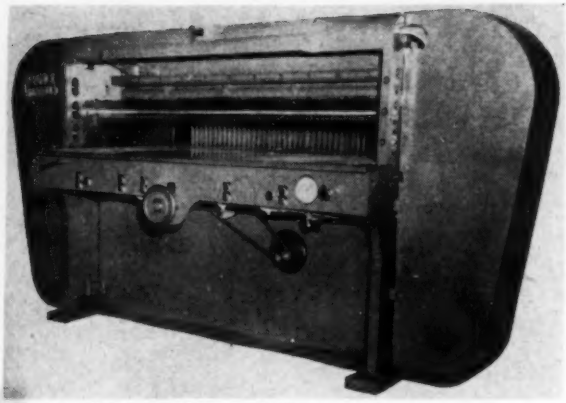


Courtesy Charles E. Francis & Co.

Fig. 3. Guillotine cutter for jointing fragile veneers.

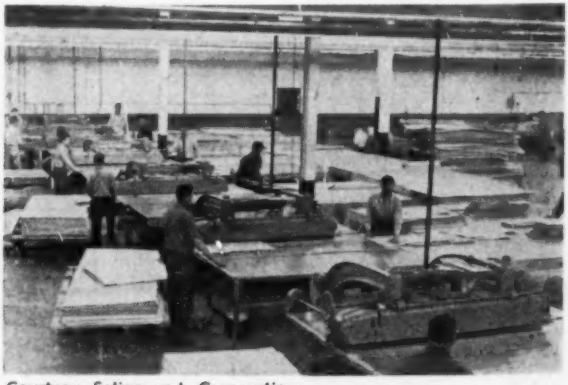
travels, cutting on its forward stroke, and being offset on the return stroke, to clear the veneer.

Cutter heads are preferably multi-bladed to reduce the depth of tool marks to an unobservable extent.

When tapeless splicer machines are to be used, a glue spreading roller is often added, directly behind the cutters on the rotary head jointer. In this way glue spreads can be lower and time saved as against brush application on packages of veneer that have to be jogged and clamped after jointing.

Such rotary head jointers can be used on any reasonably straight grained veneer, whether for face or interior layers; but they are not suitable for highly figured veneers, where small tear-outs would be likely to occur along the edges.

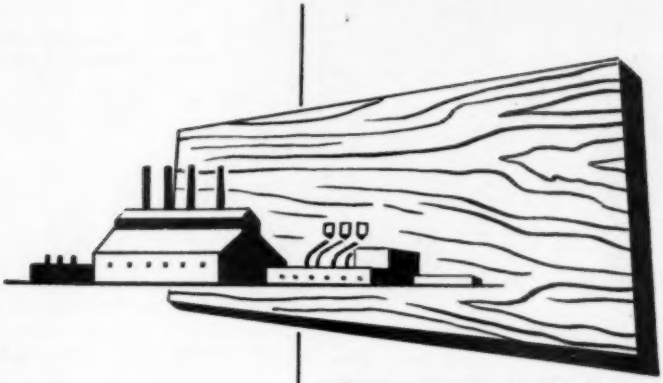
For such highly figured veneer faces the guillotine type of jointer is essential. This type of machine, shown in Fig. 3, can be used, with careful stacking for sequential figure, for both preliminary cutting to size and jointing for gluing. The knife is drawn down across the clamped package of veneer on the table, at such an angle as to produce a smooth, square and straight edge on the most fragile veneer, pro-



Courtesy Splicewood Corporation

Fig. 4. Diehl tapeless splicers, using resistance heat.

SYNTHETIC RESINS



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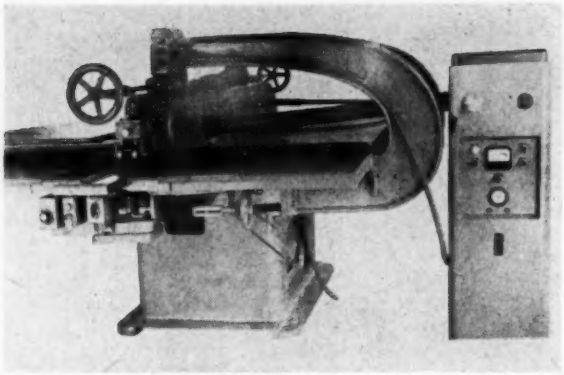


Courtesy G. M. Diehl Machine Works

Fig. 5. Tapeless splicer with electronic heat.

viding it has been properly flattened in advance.

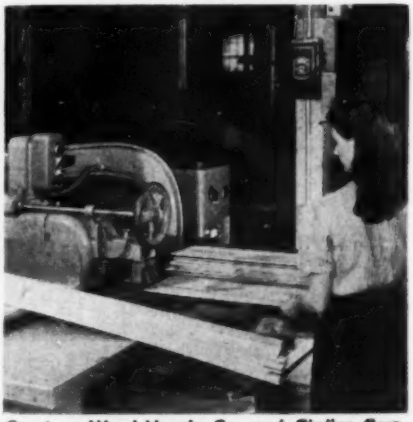
Tapeless Splicing

Tapeless splicing is one of the outstanding innovations in veneer splicing, which has proved to be of distinct value in making hot pressed plywood. Strips of tape, as formerly used, prevented the making of waterproof plywood, since the gummed tape on an inner layer always produced a more or less soluble area, with a weak joint. The earliest tapeless splicers were developed with animal glues and steam heated pressure bars. It was soon found that urea resin adhesives would make a better joint, since it was easier to regulate their setting and they gave less trouble in making hot pressed plywood.

There are two types of tapeless splicers. Several leading plywood factories have batteries of a dozen or more of these tapeless splicers. One of these types uses resistance heating units in the pressure bars, as in an electric iron, and the latest models employ high frequency current, which permits faster feeds on thicker veneers.

In essence, these tapeless splicers of both types, draw together two strips of veneer whose edges have been spread with glue, against a central "fence," and under a long heater bar, that holds the sheets of veneer in alignment while the glue is setting. The edge, or horizontal pressure, is produced by converging feed chains, raised very slightly above the table top. The vertical pressure, to keep the veneer flat across the joint, is exerted by the heated pressure bar, under coiled springs which can be regulated.

The production speed of these machines varies from 15 to 85 lineal feet



Courtesy Wood-Mosaic Co. and Girdler Corp.

Fig. 6. Fore end of electronic splicer on lumber strips.

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per minute, and the attainable glue line temperature from 250°F to 425°F. The low temperature and high speed being intended for very thin veneer, such as 1/64"; and the slow feed and high temperature provides for veneer thicknesses up to 1/8" and 3/16". Both temperature and feed should be regulated to meet the problem in hand.

A battery of half a dozen of these machines at a Wisconsin plywood factory is shown in Fig. 4.

The latest development in these tapeless splicers is the substitution of electronic heat for the resistance heating units. Electrodes are provided, just above and below the glue joint, so that the selectivity of the wet glue line for the high frequency current and heat is employed most effectively. With this type of tapeless splicer the heating action is much faster than with resistance heat, and much thicker veneers can be run through at relatively high speeds. The most useful range for the electronic machine seems to be 1/8" to 1/2" thicknesses, 1/8" to 3/16" in well flattened veneer, and above that in well jointed lumber. How far this tapeless splicer, originally intended for veneers, can be adapted to the assembly of lumber core strips remains to be demonstrated. On the other hand, the resistance type of machine, of which hundreds are in use, finds its most effective range in veneers below 1/8" in thickness.

This electronic machine is shown in Fig. 5. An extra table top is provided in this type for the return of veneers, eliminating the two way cross currents of returning veneers on the older types of the resistance machine.

An "action" picture of this electronic machine is shown in Fig. 6, where the operator is feeding lumber core strips, some 3/8" thick.

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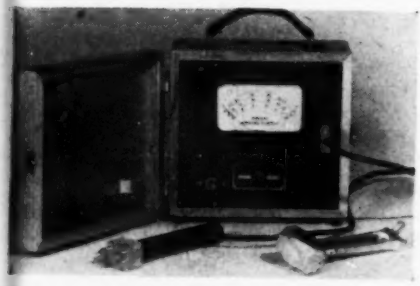

Check moisture content of lumber or veneer — any time — with the Moore Moisture Meter.

1. **Range from 6% to 65%.**
2. **Readings made direct from meter dial.**
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Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

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These tapeless splicers, of both types, are provided with an optional glue applicator roller, below and in front of the dividing fence. Some operators prefer to apply the joint glue at the tapeless splicer. It is difficult, however, to make a thin enough spread, since glue spread on a single edge of thin veneers tends to form a bead, and inevitably is at a higher spread ratio than when applied to a "book" or package of veneer. Furthermore a few minutes interval between spreading and heat curing may be desirable to release as much glue solvent as is possible by evaporation.

Another alternative for spreading the edges of the veneer is a glue applicator roller in the jointer, following the cutter head, where the spreading ratio on a clamped bundle can be kept much lower than when spreading a single edge. Some operators claim that this method introduces too much untidiness at the jointer, but this is largely a matter of diligent cleanliness.

A third option is to re-jog the veneer in bundles after jointing, place them under pressure and apply glue by roller, spray or brush. This does not give as thin a spread, as the edges are not as even as in the original jointer clamps, and requires rather close synchronization between spreading and splicing. This is the only method, however when veneers are jointed in the guillotine jointer, shown in Fig. 3. Resin adhesives properly compounded, may have an open assembly time on edge joints of several hours, sometimes overnight, but the use of resin adhesives for veneer joints, makes it necessary to heat cure before normal setting at room temperatures has made any substantial progress.

Splicing Veneers with Gummed Tape

This older method, now largely super-

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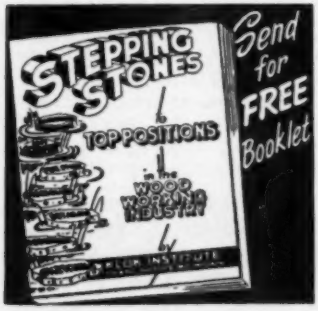

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and it's gap filling & craze resistant properties make it ideal for assembly gluing. Irregular surfaces are no problem when you use Urac 185 — for

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This remarkable adhesive which was formerly available only to large users is now available in Fives, gallons, quarts & pints.

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THE NELSON COMPANY

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seded by tapeless splicing on straight grained veneer, still remains as standard procedure for fragile veneer faces, where substantial end grain may be exposed in jointing the edges. However the taped surface of the veneer can be laid "outward" in plywood assembly and sanded off. Obviously, in such cases, there are no strips of gummed tape to impair the waterproofness of strength of the joint.

The taping machine has the same central fence, as the tapeless splicer, similar converging chains or rollers, but a top pressure roller to force the moistened gummed tape firmly over the joint. Care must be used to employ thin gummed tape, and to avoid multiple layers of tape at any one point, since this tape is pressed into the veneer during hot pressing, which complicates sanding off the tape. Some operators quickly dip the hot plywood direct from the hot press, and peel off the tape, in which case the compressed areas tend to return to normal thickness.

Gummed tape may serve another useful function in reducing the potential breakage in large sheets of tapeless splicer veneer. A line of narrow (1/2" to 3/4") tape at the extreme ends of such large pieces will strengthen them for handling and be trimmed off in dimensioning the finished plywood.

Storage of Veneers Ready to Lay

During these various stages of preparation, veneers may vary in moisture content, due to varying atmospheric conditions. Thin veneers are particularly susceptible to such changes, far more so than thick veneers or lumber cores.

An air conditioned storage room should be provided for all finished veneers, with controls adjusted to bring these veneers to the proper moisture content for gluing. When veneers are

to be used in Tego gluing or with room temperature setting urea adhesives, there should be several subdivisions of such rooms, separately controlled. Well prepared veneers, as well as properly made lumber cores, are a "must" in making quality plywood.

The End

F. P. R. S. CONVENTION

Arrangements are nearing completion for the Fifth Annual National Meeting of the Forest Products Research Society. W. Burdette Wilkins, general chairman of the meeting committee, promises that May 7-11, 1951 at Convention Hall, Philadelphia, Pa., will see the most elaborate and extensive program of technical sessions and display of machinery, equipment and service materials ever attempted by the society, with both the meeting and industry show being developed on a major theme of "Conversion and Mobilization of the Wood Industries."

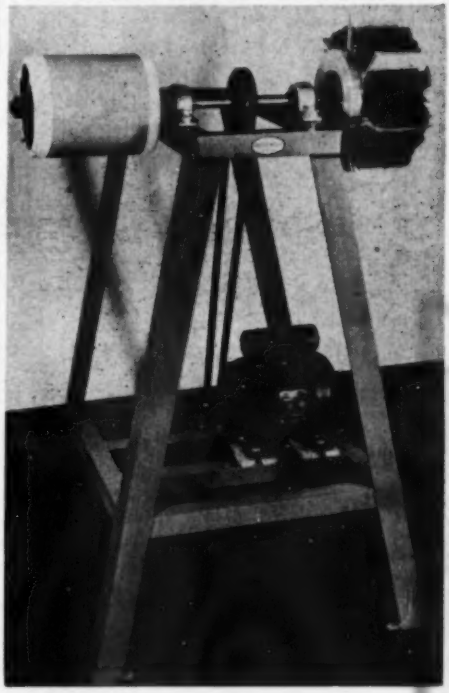
The entire program has been planned to aid industry with the national defense and mobilization programs. The program has been developed to show: (1) how to most effectively utilize modern woodworking machinery and equipment; (2) how to train more productive manpower; (3) how to conserve resources through better utilization.

Admission to this international event is by invitation—to confine attendance to qualified members of the industry. To prevent overlooking anyone in this classification, all those wishing to attend or to exhibit are invited to write for further information to 1951 Annual Meeting Comm., Forest Products Research Society, 2 Columbus Circle, New York 19, N. Y.

PRIVATE BUILDING INCREASES

More homes were started during January, 1951 than ever before, says the U. S. Department of Labor. Of the all-time high of 87,000 non-farm dwelling units, 84,000 units were the work of private builders.

LOWER YOUR SANDING COSTS



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LEITELT IRON WORKS
400 Mill St., Grand Rapids 2, Mich.

Notice in the installation below how one man handles a kiln load of lumber. The power Transfer Car does the actual work, whether it's pushing or pulling a load into or out of dry kilns or storage tracks.

Woodwork Preservation

BY

JOHN G. HAMMOND

CHEMICAL WOOD preservation plays an increasingly important part in the woodworking industry as it becomes more difficult to get clear, sound, decay and insect-resisting species of woods for cabinet work, building and construction.

A wood that has been treated with a water-repellent preservative containing pentachlorophenol ("penta") resists wood-staining and wood-decaying fungi, molds, insects and dimensional changes.

Characteristics of the Preservatives

A wood preservative should be practically colorless, free from odors after drying and at the same time highly resistant to wood-destroying organisms. The preservative should not leach in water or evaporate in warm atmospheres. The formulation should include a resinous type of water repellent that is completely soluble in the vehicle. The vehicle should have a low viscosity so that it can penetrate the wood by immersion in a dip tank or bath within a few minutes and be ready for finishing or glazing within 24 to 48 hours after treatment. The treatment should be almost invisible so that, if required, the natural grain and color of the wood can be left exposed. Treated wood should be capable of being finished in any way that untreated wood is usually finished. The application of the usual stains, lacquers, varnishes and pigmented paints should present no problem.

Suitable Formulations

Formulations developed especially to meet the requirements of the woodworking industry have appeared under several trade names. Several years ago the Western Pine Association, Portland, Oregon, working with the National Wood Work Manufacturers Association, and the Forest Products Laboratory, formulated a water-repellent preservative that is ideally suited to meet the requirements of millwork, cabinet and furniture manufacturers as well as for architectural above-ground building material.

These preservatives are readily available and comparatively inexpensive. A dip treatment of five to ten gallons per thousand board feet is considered adequate for millwork, furniture and cabinet work, not in contact with the ground or damp masonry. Handle manufacturers and manufacturers of sporting goods will find the formulations in the quantity mentioned satisfactory.

Dimensional Change

Manufacturers of caskets, cedar

Mr. Hammond is with the Protection Products Manufacturing Co., Kalamazoo, Michigan.

Dri-Vac treating tank installed by Cowser & Co., Dallas, Tex. This plant serves many of the lumber dealers in Dallas as well as their own customers. The principle of the Dri-Vac process, developed by the Protection Products Manufacturing Company, Kalamazoo, Mich. is to evacuate the air in the wood by means of a 15 h.p. vacuum pump before the treating solution is pumped into the tank. With this accomplished, the wood preserving solution flows into the pores of the wood as it is pumped into the sealed tank.

chests, cabinet work and furniture are all acquainted with the problem of dimensional change. If wood products are exposed to dry atmospheres, checks and warping usually occur in time. The resulting damage is a total loss to the dealer and manufacturer alike. Wood properly prepared for the woodworking industry should have a moisture content not to exceed 24% by weight. When storage or show room temperatures are high without enough humidity to maintain the proper moisture balance, the damage occurs. Even the best finishes are porous enough to allow the moisture to escape from the wood cells.

The reverse is also true. Too much moisture absorption will distort wood, raise the grain and pull joints out of mortise. Consequently, the use of a water-repellent wood preservative kills two birds with one stone. It resists dimensional change and wood-destroying organisms under most conditions.

Control of Disfiguring Molds

In some localities the use of wood products is almost prohibitive because of wood-disfiguring molds. Recently Dallas millwork manufacturers have been supplying their customers with "penta" water repellent treated panelling, interior trim and cabinet work. The treated wood resists the air-borne spores which would otherwise establish molds on the woodwork. Simultaneously, damage from termite attack is under control. This is significant in a locality where termite shields are required to meet the city building code.

Termite Damage

Termites are not, as many people suppose, dependent on warm humid climates for their existence. Furthermore, termites have been native to North America for millions of years. Fossils have been found of termites resembling present day species of damp wood termites. There are many varieties of termites. The two that do the most damage are the subterranean and the dry wood species. The former build shelter tubes from the earth to the wood they attack. The presence of these mud-like veins extending from

the earth and passing over masonry or metal to wood indicates their presence. The dry wood variety fly to crevices in the wood and build a nest during their mating season. Fortunately, the latter variety is confined to a narrow band around the southern states extending from California to the Carolinas along coastal areas. They will attack furniture and interior cabinet work and trim. The formulation described will resist their attack.

Wider Range of Woods

Some of our most beautifully colored and naturally grained species of woods lack resistance to destructive and disfiguring organisms. These so-called non-durable woods are frequently suitable for fine cabinet work. The Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison, Wisconsin, can furnish those interested with a list of these often unusually grained woods. Treating them with approved wood preserving formulations will make them as durable as any other species.

Load of millwork coming out of automatic treating tank at William Cameron Company, Inc., Waco, Tex. Two elevators alternately raise and lower the loads of wood in and out of the treating baths. The lights over the doors flash when the treating cycle is complete.

Dip tank of the Weaver Products Treating Company, Miami, Fla., treating millwork. A brown stain has been added to the colorless solution to enable the building inspector to easily identify the treated work. Miami building codes specify treated building materials.

Methods of Treating

Although superficial methods of applying wood preservatives are not considered to be the ideal, brushing, spraying and dipping are considered better than nothing. Complete immersion is by far the best of the lot. As mentioned before, a three-minute dip has proved to be satisfactory for treating ponderosa pine millwork. Sometimes brushing and spraying must be used, however, and again it is better than nothing.

Some lumber dealers have installed tanks for treating lumber with water-repellent preservatives. The success that they have with merchandising treated lumber indicates that many more will follow. If it is possible, it is recommended that these dealers be patronized. They have personnel familiar with treating and can furnish good service as a rule. However, a small tank can

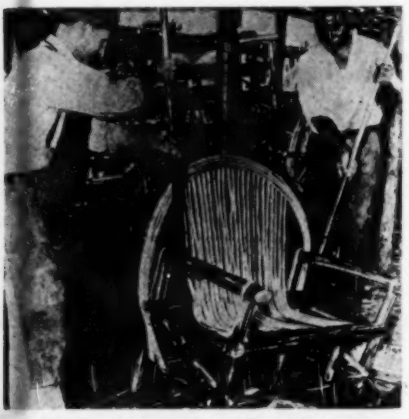
be installed on woodwork manufacturer's property for small expense. All that is necessary is a tank, a draining rack, and a mechanical device to raise and lower the work. Wood must be dry before treating.

Complete Coverage Necessary

It does small good to treat wood if the interior is exposed later on in manufacturing. The ideal method for large assemblies is to cut and sand all parts and then treat the wood parts in the last operation before assembly.

If this is not practical, exposed surfaces should be dipped or brushed before gluing and assembly. The wood should be dry before glue is applied, needless to say.

The William Cameron Lumber Company at Waco, Texas, has a dry room in which their treated millwork is placed in damp weather. They usually treat their products after they have been assembled as the last operation. This is by far the best way to handle treatment if the work is not too large to handle easily. In hot dry weather they do not bother to run the buggies of treated wood through the hot room. They are sufficiently dry by the time they reach the end of the line at the shipping docks.



Rustic furniture being dipped in water repellent preservative containing pentachlorophenol. Wood must be thoroughly dried before immersion.

Row boats being immersed in water repellent preservative. Boat liverymen claim that treated boats do not decay or water-log. Here is a typical example of treating woodwork assemblies.

Conclusion

Wood preservation is a direct responsibility of the woodworking industry. Because of a lackadaisical attitude, many wood products have been replaced with products of other materials. Everyone knows that untreated wood decays. Everyone knows that steel rusts. The steel products manufacturers have turned to galvanizing, electroplating, metal spraying, vitreous enamels and baked enamel finishes, all of them requiring elaborate and expensive material to resist corrosion. Good wood preservation can be simply and inexpensively applied. And, it will be by those who care about their future prosperity.

The End.

FREIGHT CARS OF TREATED WOOD

Five hundred flatcars of the Chicago, Rock Island and Pacific Railroad are

NEWMAN MACHINES

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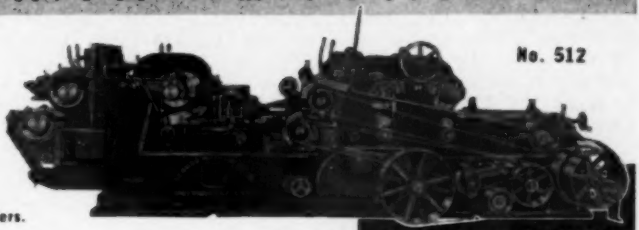

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Capacity: 16" and 24" wide, 8" thick. Speeds up to 325 feet per minute. 8" dia. cutting circle. Six 12" dia. feed rolls. Single and double profilers.

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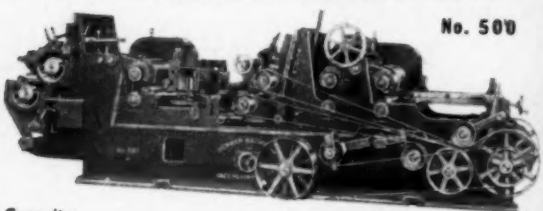

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ALL NEWMAN cylinders or heads are DYNETRICALLY BALANCED insuring an accurate and superbly finished product.

The ball bearing NEWMAN 71 (shown below) will grind all sizes of cutter heads. Table is 33" long by 9" wide with horizontal travel of 25" and is heavily ribbed to maintain accuracy over entire travel. Maximum cutter head swing is 11".

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The NEWMAN 55 feeds stock automatically to high speed planers and matchers up to 450 lineal feet per minute. Capacity: 30" wide, 8" thick. All adjustments and controls are centrally and conveniently located.

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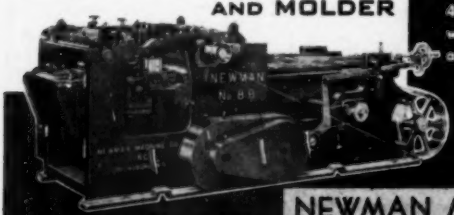

Unsurpassed for work in small and medium mills

The NEWMAN 8-B planes 22" wide and 8" thick, joints 4" thick and will match 14" wide. 6" diameter feed rolls. Speeds of 30, 50 and 75 feet per minute.

MAY WE SEND YOU FULL DETAILS?

NEWMAN MACHINE COMPANY, INC.
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being re-decked with chemically protected lumber at the Company's Peoria, Ill., shops. The chemical is expected to extend the life of the decking two to three times.

As part of the heavy repair program at the shops, the cars are being run through at the rate of one a day. Planking for the new decking is pressure treated with Penta, common term for pentachlorophenol, at the Little Rock, Ark., plant of the Koppers Company, Inc.

The chemical, a product of Monsanto Chemical Company, is widely used to protect structural and other lumber against decay, termites and other wood degrading organisms. Properly applied, it results in a permanent treatment which is clean and easily handled.

ANNUAL MEETING FOR MAHOGANY ASSOCIATION

The Mahogany Association, Inc. held its annual meeting late in January. All officers were re-elected and are as follows: Ichabod T. Williams, president, of Ichabod T. Williams & Sons, New York; Harry A. Freiberg, Jr., vice president, of Freiberg Mahogany Co., New Orleans; Robert P. Thompson, treasurer, of Thompson Mahogany Co., Philadelphia; and George N. Lamb, secretary-manager, of Chicago.

As with many other industries, there were so many "ifs" in the immediate as well as in the more distant future that no prediction could be made as to demand or probable imports in 1951. The greatest unknown factor appears to be the extent and rapidity of the development of war-use demands for mahogany.

CHANGE IN NAME

The Cummins Business Machines Corporation of Chicago announces that it has changed its name to Cummins-Chicago Corporation. Both internal growth and external expansion indicated the desirability of a corporate title. The firm manufactures electrical portable tools.

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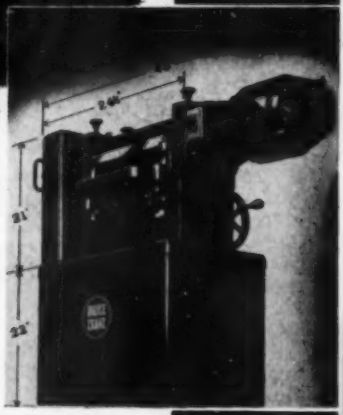

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HEAVY DUTY 12" x 4"
THICKNESS PLANER

Handles every size of material commonly used, effecting a considerable saving over the price of machines which also handle seldom used sizes.

Includes all the fine features of larger, expensive planers—yet costs $50.00 to $100.00 less than you would expect to pay.

Planes materials as short as 6½" and handles some jobs impossible on larger planers. Planes hard wood down to 1/16" thick, smooth as silk, and to a thousandth of an inch precision without tearing.

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Accept nothing less than a one-piece frame. In 99 out of a hundred shops, the many, many more years of super-accurate productive use, guaranteed by Boice-Crane's one-piece frame, is a far better "buy" than one offering chiefly a bit more but seldom used capacity; or one at a lower price but with inferior bolted-up frames.

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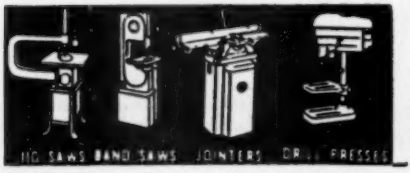
Sold through industrial supply distributors in most cities



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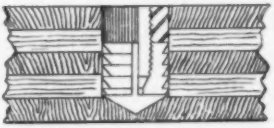
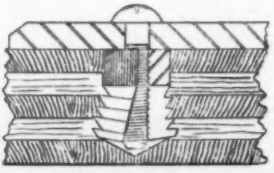
Installation is simple and fast: first drill a clean hole—



Then drive anchor nut flush with surface, using ordinary hammer—



Expand with machine screw, punch, or torque expander. Anchor nut is now installed.

MODERN FASTENERS

Screws and Rivets

By Ned Bailey

To do justice to the subject of modern fasteners will take far more space than we can allot to it in one issue of WOOD WORKING DIGEST. We are going to have articles, from time to time, about modern fasteners, appearing in future issues. Due to the number of requests we have had, asking about screws and rivets, we will start with some of them.

I BELIEVE a background of information on a product often explains its development and use, and shows the evolution from the original to the present. With this in mind, I went to my encyclopedia to find out what it had to say about screws and rivets, and found it described them and their use as follows:

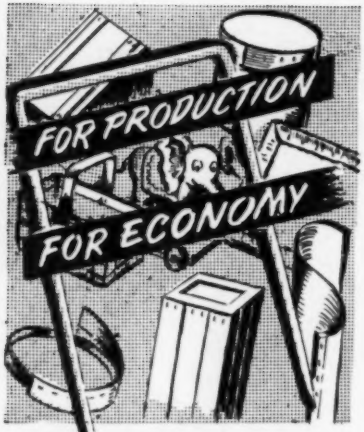
"The screw, in mechanics," it said, "is a cylinder that is surrounded by a spiral ridge or groove, every part of which forms an equal angle with the axis of the cylinder, so that if developed on a plane surface it would be an inclined plane. The screw is a modification of the inclined plane. A convex screw is known as the external or male screw, a concave or hollow screw — generally termed a nut — is an internal or female screw.

"The mechanical effect of a screw is increased by lessening the distance between the threads, or by making them finer, or by lengthening the lever to which the power is applied; this law is, however, greatly modified by friction.

"The parts of a screw are the head, barrel or stem, thread and point. It is frequently used in capacities of delicate adjustments, as the micrometer screw. Other devices are wood and metal screws, and carpenters' and machinists' vises. The screw was perfected in the United States by William Sellers, who invented a machine for cutting standard threads."

The same source, my encyclopedia, describes the rivet as "a short bolt with a flat or rose head, employed for uniting two plates or thin pieces of material. The stub end is swaged to prevent its withdrawal. When used for joining pieces of wood or leather (as in making belting) an annular disc, called a burr, is placed over this end previous to swaging in order to give a greater bearing. Rivets are usually cut from round metal rods and formed by special machinery. In riveting together wooden surfaces, they may be lined with metallic plate, or washers may be placed under the head and the swaged burr, to prevent the indentation of the wood."

These descriptions give the basic features of both the screw and the rivet,



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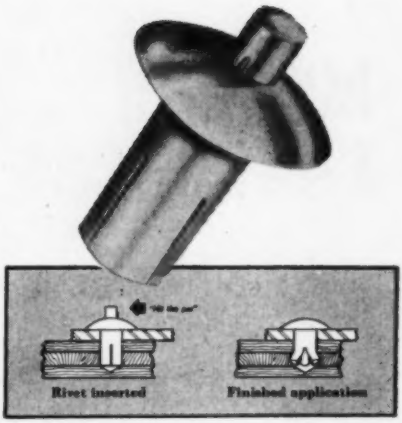

Close up of rivet. Left, rivet inserted; right, finished application.

from which there have been developed many new and surprising types of both. The newly developed screws and rivets have not replaced the older ones. However, they are used to take care of new conditions and for a much wider variety of purposes, and in combination with other devices.

The increased use of plywood and laminates have been greatly facilitated by the development of devices for fastening them to each other or to other materials without disfiguring the panels. There are now available "drive rivets" and "anchor nuts" which can be installed from one side by one man, and no special tools are needed. In the case of the rivet, a hole is cut rivet size and length, and the rivet is inserted. There is a pin which extends above and at the center of the rivet head. All that is necessary is to drive the pin flush with the head of the rivet using an ordinary hammer. There is no bucking or trimming needed. This easy and speedy installation cuts production time while giving maximum grip.

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Installation of anchor nut. Left, drill clean hole; center, drive anchor nut flush with surface, using hammer; right, expand with C type screw, punch or torque expander.

drive rivets to draw the components, that are being fastened together, in a tight, dependable joint. They expand inside the wood, leaving both surfaces clean and unmarked. These rivets are available from stock in 3/16" and 1/4" diameters, with grip lengths ranging from 3/32" to 5/8". Modified brazier and 100° countersunk head styles apply to these rivets.

For fastening plywood and metal clad plywood without marring, there is a modernized type of screw and nut combination, know as an "anchor nut." This device gives secure anchorage for attaching plywood and panel material permitting the use of machine screws in plywood.

Anchor nuts are one-piece threaded steel inserts, which are locked against torque and pull-out by serrations and expanded barbs. They hold rigidly in materials ⅜" thick or thicker, resisting all force exerted against them until the failure point of the wood itself is reached. Parts may be attached, removed or replaced without marring plywood, or plywood faced with metal or plastic. There are no disfiguring bolts, nuts, screws or washers to project through the panels.

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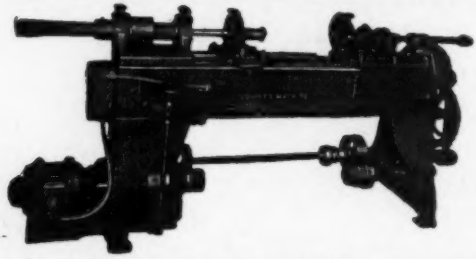

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Joining plywood by two metal batten strips, (left) before, and (right) after expansion.

The installation is simple and fast. First, drill a clean hole of the desired size and depth, then drive the anchor nut in, until it is flush with the surface, using a hammer. You are then ready to expand the nut, using a type C screw, punch or torque expander, and the installation is complete. These anchor nuts are available in varying sizes to assure maximum gripping power in all wood thicknesses from 3/8" up. Sizes range from 6-40 to 5/16-24. These anchor nuts are also available in national coarse threads.

From the foregoing, it can be easily understood how many places these newer type screws and rivets are found useful. For example, among the many places in railway car construction where anchor nuts are used, are securing the wall bracket fixture to a portable table in a parlor car, fastening lighting fixtures to the plywood wall of a sleeping car roomette, and installed in the car wall as the base for attaching a coat hanger. In television, they are used as anchorage for the bracket for attaching the television tube to the cabinet. In telephone switchboard construction they are used for fastening the removable side panel. The motor-mount bracket is held to the underside of many transcription turntables with anchor

Joining two plywood sheets (left) before, and (right) after expansion.

nuts and they are also used for mounting hinges to join the legs and the top of knock-down canteen tables.

In an early issue we will continue this series on "Modern Fasteners".

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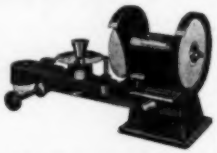

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Know your wood

RED AND SWEET GUM

BY NED BAILEY

IN THE BOTANICAL world, the red gum is continentally isolated from the rest of its genus. The origin of its Latin name "liquid-ambar styraciflua," is traced to the writings of an early Spanish explorer in Mexico. In 1651 he described the red gums as "large trees that exude a gum-like amber." In parts of Mexico today natives collect this gum, which is known in New Orleans and Mexican ports as "copalm balm." The extraction method is the same as that practiced in the southern United States in obtaining turpentine from long leaf yellow pine.

This copalm balm is exported principally to Europe where it is used medicinally and as an ingredient in the incense burned in the censers of the Greek and Roman Catholic churches. It blends with frankincense and myrrh much like styrax, which is a similar product obtained from the oriental sweet gum tree, "liquid-ambar orientalis." This word "styrax" suggests the origin of the specific name of our own red gum "styraciflua."

Although of closer kin to the witch hazel, red gum superficially resembles the maple. Its glossy, aromatic five-to-seven pointed, star-shaped leaves are about three to five inches long. The leaves turn a brilliant red in autumn before dropping. The name "red" gum refers to the color of the wood as well.

The flowers of both sexes occur separately on the tree when the leaves are about half grown. The clusters of hairy, green, pollen-producing flowers are two to three inches long and at the end of the new growth. The seed-producing flowers hang as greenish balls on long thread-like stalks from the base of the upper leaves. These develop into brown seed balls or burrs, one to one and one-half inches in diameter. They remain on the tree during the winter.

The deeply furrowed, grayish brown bark, with light gray, corky winged twigs and spherical, dark brown, persistent seed clusters are outstanding botanical features, which once observed could scarcely be forgotten. The red gum, or heartwood, is reddish brown with an occasional dark streak in "figured" gum. Sap gum, or sapwood, is nearly white.

Red and sap gum—also called sweet gum—grows from southern Connecticut to Florida, and west as far as eastern Texas, Oklahoma, Arkansas and southeastern Missouri, where it prefers rich, moist soil, and, while not a swamp tree,

grows well on occasionally flooded land. It grows in mixture with red maple, elm, ash, cottonwood and oaks. These gums grow 80 to 120 feet high, and 18 inches to 3 feet in diameter at breast height. They are most abundant and obtain their greatest size in the lower Mississippi river valley, and the southeastern coastal states, which makes them an important southern hardwood.

In the south specimens reach five, and occasionally six feet in diameter. The average tree is smaller, producing logs three to four feet in diameter. These are the kind from which high grade red gum lumber is manufactured. Logs smaller than this produce sap gum.

The latest estimates, based on recent extensive surveys of 200 million acres of forest land in the south, show that approximately 40%, or 80 million acres, are growing hardwood trees. On this vast acreage there is reliably estimated to be 23 billion board feet of standing red gum timber 15 inches and over in diameter. Large quantities of younger and smaller red gum trees are growing along with this huge volume of merchantable timber. This living reservoir of timber is being augmented by growth, and at the present rate of cutting, or even at a considerably increased rate of cutting, consumption will not keep pace with growth. At a conservative annual growth rate of 4% or 20 billion board feet (deducting 3 billion from the grand total for timber difficult to log, or otherwise not economically available), the forests are annually growing 800 million board feet of red gum timber. The present average annual cut is about 500 million board feet. A greatly increased use of red and sap gum would not endanger the perpetual supply and growing stock of this universally and extensively used southern hardwood.

Red gum has an interlocked grain, which means that the elements, or wood fibers, are not constant in one general direction. Wood with interlocked fibers is tough but tends to warp and twist in seasoning. Science and research, however, have solved the problems of warping and twisting to such an extent in the case of red gum that annually close to ½ billion feet, or 25% of all hardwoods used, is of this species.

Texture is a term which refers to the relative size, quality, or fineness of the elements as affecting the structural properties of a wood. Like grain, it requires qualifying adjectives to attain specific meaning. Red gum has a comparatively fine, even texture. It is a diffuse, porous hardwood, having the fine pores distributed quite uniformly through the wood. The annual rings are inconspicuous and scarcely discernible to the naked eye. This quality of fineness of pores and uniformity makes red gum an exceptionally useful wood for furniture. The even texture caused by the small pores insures an extremely smooth surface when finished with varnishes or lacquers, enamels or paints. In furniture and woodwork, where the ends or edges of the lumber are exposed, the lack of definite demarcation of the annual rings and the uniformity of the cell structure make red gum a prized wood for cores and for solid carved parts, pedestals, chair arms, turned legs of chairs and tables, and the intricate carving in certain types of furniture and interior trim. Red gum is moderately heavy, weighing 34 pounds per cubic foot when air dried. It is classed as medium to work with hand tools, and works easily in machines. Red gum holds nails and screws well, and glues easily. Because of all these desirable qualities both red and sap gum are extensively used in manual training departments and in industry for innumerable small objects made of hardwood.

With the exception of walnut and cherry, red gum is the only North

American hardwood species whose value is greatly enhanced by the large amount of heartwood present. This darker heartwood further enhances the value of the tree when it is infiltrated with areas of dark brown, or almost black pigment. The heartwood area shown on the end of a log may be irregular, assuming a starlike shape. When this occurs the lumber, or veneer, cut from that particular log will show intricate designs on the surface of the boards and veneers.

Stripe or ribbon, is still another type of figure found in red gum. This type of figure consists of alternating lighter and darker stripes running more or less the length of a board and varying from less than ¼" to more than 1¼" in width. It is pronounced only in quarter sawn, or nearly quartered lumber.

Coming from the same tree as red gum, except for color, sap gum possesses almost all the excellent properties of this universally used southern hardwood. The smoothness, the evenness of texture, ease of working with hand tools and machines, coupled with its light color and ability to take stains, paints, and enamels, make sap gum the desired wood for innumerable uses, ranging from the small, white depressor sticks your doctor puts into your mouth when he asks you to say "Ah" to the spotless white or colored enameled kitchen cabinets and woodwork. Sap gum is used extensively in the form of veneers for making plywood, and also finds wide use in barrels, baskets, boxes, and crates.

Figured and ribbon stripe red gum veneer are used in furniture and paneling. The other unseen, but nevertheless important, parts in the proper construction of plywood are the cores and crossbanding strips of veneers hidden beneath the attractive outer surfaces. Red and sap gum, because of their evenness of grain and their properties of working

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and gluing, are used extensively for cores and cross-banding in the manufacture of plywood. Sawed veneers possess the quality of being alike on both sides. This enables either side to be turned out in matching face stock for figure in the manufacture of panels.

Rotary cut veneers are made in a lathe by revolving the log against the knife, the veneers being peeled off in a continuous sheet very much like unrolling paper. Red and sap gum veneers are manufactured by all three processes, the method employed depending upon the use to which the veneer is put. Another more humble, but at the same time highly important, use for red and sap gum veneers and plywood is in the manufacture of berry and fruit baskets, boxes and crates.

To describe and enumerate all the uses of the millions of feet of gum lumber consumed annually would take a book in itself. No hardwood is more extensively used for so many different articles.

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Additional information on any product mentioned in this issue is available from our Market Service.

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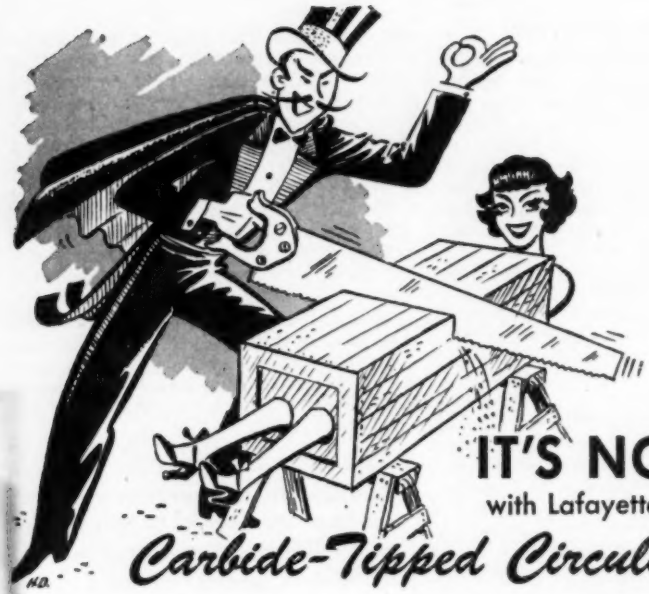

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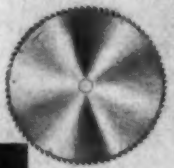

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PREVENTING FIRES IN WOODWORKING ESTABLISHMENTS

BY J. T. BABCOCK

ASSISTANT CHIEF ENGINEER, FACTORY INSURANCE ASSOCIATION, CHICAGO, ILL.

PART 1

WOODWORKING establishments for many years have not been looked upon as the best risks by insurance carriers. Today this should offer a challenge to the aggressive safety and fire protection engineer. By applying knowledge of fire control together with modern equipment and construction, the past record of woodworking establishments should be improved to the point where they are no longer frowned upon by the insurance fraternity.

Next to grain elevators the woodworking fire records show this class of occupancy to produce the greatest average loss per fire. In analyzing the causes of all these fire losses, we find that about one-half are caused by special hazards, while the other half are caused from so called "common hazards." In the special hazard group about 40% of the fires are caused from the handling of wood waste, either in the collecting system, sawdust and shavings vaults, or burning of this material.

There is one factor that seems to be dominant in most of our woodworking plants and that is, many of the buildings were constructed either entirely of wood or having wood floors and roofs. The woodworking industry, being an old industry, has many plants that have passed through the modernization problem of rebuilding and re-equipping to replace the former engine or belt drives and substituting direct or electric motor drive. This has frequently left conditions that assist the rapid spread of fire through concealed or inaccessible draftways.

Probably another basic cause for the serious fire record in the woodworking industry is the inefficiency of many of our woodworking plants. This inefficiency may not come from the actual production and equipment in the plant, but from the geographical location of the plant compared to the source of raw material. Many of these plants originally were built in the heart of a generous timber supply which has since been depleted, and, now, this raw material is shipped in at the expense of high freight rates and handling charges, leaving the plants at a competitive disadvantage.

Naturally, when top managements are not making good return on their investments, they are reluctant to make capital expenditure to improve the property. This offers even more of a challenge to the good engineer to be able to make something from nothing without spending a large amount of money.

One of our greatest defects in the woodworking plant, as originally con-

structed, was the popular "air space basement" between the ground and the first floor. This was a necessary detail in the past and most of the buildings were built with this blind space for ease of installing equipment and drives.

Today most of these mills have been converted to modern drive and the need of these blind spaces has been mostly eliminated, but this "air space basement" remains and offers a most serious handicap in the control of fire. Wood waste has accumulated or still accumulates below the floor, the floor becomes oil soaked and a fire once gaining access into this space, is most difficult to reach. In many cases the fire department has attempted to chop holes in various places in the floor, only to find the fire beyond them, with the final result that the entire floor and building are a total loss.

If the floor cannot be replaced with a reinforced concrete or other incombustible construction, then barrier walls should be constructed at frequent intervals across the building to prevent the rapid spread of fire in this area. These barrier walls need not be substantial, but can be built out of any incombustible material, such as concrete blocks or other masonry materials or even cinders or sheet metal, provided the space can be kept entirely sealed to prevent the rapid spread of fire until it can be extinguished.

Hollow frame wall construction in some areas offers the usual handicap to the control of fires in walls, but these can be easily corrected by filling the hollow space with some of the light granular incombustible insulation material or otherwise sealing off the hollow flue through which fire rapidly travels.

In many woodworking establishments congestion has proved a serious handicap in the control of fire. Not only congestion of equipment, but congestion of parts being manufactured and congestion of raw materials, as well as finished stock passing through the plant. The problem of congestion is one of arrangement and production control. The prompt removal of parts immediately required for assembly should be encouraged and the arrangement of raw materials passing through the plant should be so governed that congestion can be greatly reduced.

The loss of the lumber yards or raw material storage piles in respect to woodworking establishments should be viewed with great concern. The rating authorities usually indicate 200-feet to be the minimum clear space necessary between lumber storage piles and buildings. Where this clear space is not available steps should be taken to provide adequate extinguishing facilities to protect against this exposure. Incombustible construction such as a brick fire wall, of course, offers the ultimate in this protection. In most cases the ultimate is not practical and some modification should be adopted.

While preventing fires is better than the control of fires, we must be prepared to control a small fire before it becomes a sizable one. Automatic sprinklers, of course, offer the most effective fire control, but again unfortunately, many woodworking plants are located where automatic sprinklers and powerful water supplies are not readily available.

Many of our woodworking plants are already equipped with an automatic sprinkler system, but like a lot of our plants built years ago, the sprinkler system has deteriorated with age and may today be ineffective unless it is regularly cleaned internally, removing the scale and obstructions of the pipe which have accumulated after years of service. The sprinkler heads should be examined and samples tested to determine if they are as sensitive and

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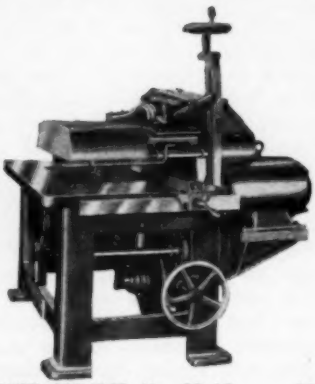
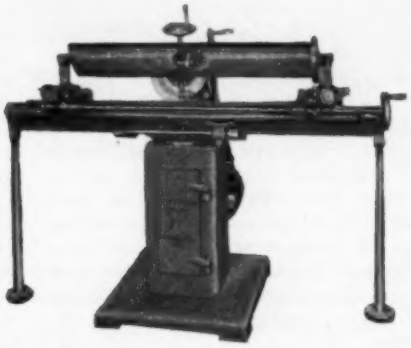


GANG RIP SAW NO. 112 . . . Designed for either single or gang ripping. Speeds up to 250 F.P.M. Drive and saw arbor mounted on heavy duty Fafnir ball bearings. Equipped with complete safety features. Either belt or driect motor drives. Four models to choose from. Write for bulletin C-3.



KNIFE GRINDER No. 98-A5 . . . 30" full automatic feed grinder with direct motor drive. Used for straight or hollow grind, thick or thin knives. Grooved knife plate for quick set-ups. Equipped with 1½ H.P. ball bearing motor. Eight models of knife grinders, both direct motor and belt drives. Full automatic or semi-automatic feed, 30" and 36" models. Write for bulletin C-4.

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All cutter head grinders equipped with new, revolutionary, easy-to-adjust head setting gauge G-11. Our engineers will be glad to recommend the model best suited to your plant. Write for bulletin C-2 today. You will be amazed at the low prices of Dependable Woodworking Machinery.

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effective as modern sprinkler heads should be.

Unheated areas in woodworking plants are best protected by dry pipe sprinkler systems. Dry pipe valves that control these sprinklers should be tested frequently and carefully maintained.

The protection of woodworking establishments that are not practical to protect with automatic sprinklers, either because of financial or geographical reasons, can probably obtain the best degree of protection from the hose standpipe located inside of the building and connected to as reliable a water supply as can be found. The 1½ inch inside hose lengths of 75 feet have been found to be the most practical and if they are provided frequently enough so that all areas can be reached with one or more of these small hose lines, a great degree of fire protection can be provided. The spray nozzle has been found to be of advantage in controlling a fire in wood waste and wood construction as it greatly extends the area covered by one nozzle and applies water with greater cooling or quenching efficiency.

In addition to the small hose lines a good supply of fire extinguishers of the proper type either anti-freeze or water type should be provided so that there will be one extinguisher for every 2,500 sq. ft. of floor area. Ordinarily carbon dioxide is not considered the best for wood or Class A type fires.

It is not sensible to spend money for fire control equipment unless attention is also given to the use of this equipment. The development, organization and training of a private fire brigade is of utmost importance and has an advantage from many angles. First of all a private fire brigade will instruct the employees on how to use all the fire equipment that has been provided for the plant so that a minimum of time will be lost in event of an accident and the equipment will be used to its best advantage.

Second advantage of a fire brigade is that it brings home a constant educational alerting of the employees concerning the fire hazards. A member of the fire brigade automatically becomes fire conscious and is one of the plant's best fire inspectors. He is interested in the fire control equipment and also interested in the prevention of fire. Frequent drills actually using the equipment are essential and should be encouraged.

The fire brigade should be encouraged to cooperate with the city fire department or any public or rural fire department that is available in the vicinity of the plant. A definite routine should be established so that in the event of a fire it would result in a fire alarm given first before any employee attempts to extinguish a fire independently. Most of our large fires are caused due to the delay in giving a prompt fire alarm. It is much better to call the fire department and fire brigade unnecessarily than to call them too late when they are necessary.

The watchman service for a woodworking establishment is one of the most essential functions in the prevention of fire. It should be realized that the watchman is in charge of the plant three-fourths of the time. We realize that it is sometimes difficult to obtain a high caliber watchman, but the responsibility of the watchman can not be too strongly impressed. There have been many cases where watchmen have discovered small fires and through inability to appreciate the situation or lack of instructions or for other reasons, have not promptly called for help with the result of tremendous property damage. The human mind is the best piece of fire prevention equipment in existence—when it is working.

The usual procedure in discussing

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● Before it leaves the factory, every Diehl Cutterhead is statically and dynamically balanced. That's one reason why high speeds and fast feeds are no problem when you use Diehl Cutters and Cutterheads. In addition, you profit from 40 years of specialized Diehl experience. You want simple design—fast, accurate set-up—high production over a long and trouble-free wear-life. Diehl engineers know your needs today, anticipate tomorrow's.

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factories is to describe first the construction, second the occupancy, and third the protection feature before the occupancy of woodworking establishments, because the occupancy embodies such a wide scope of details.

This wide scope of details can probably be best summed up, in the prevention of fire, under the heading of one thing, "good housekeeping." There is no other single control mechanism that has as important an effect on the prevention of fires as does good housekeeping. This good housekeeping not only means the control of waste material, but it also means the proper arrangement and control of production, production material, machinery and raw materials both inside and outside the buildings. It means the plant does not offer the invisible safety hazard when involved in a fire.

This is the first section of a two-part article on fire prevention in woodworking plants. The second section will appear in the April issue. The paper was originally presented at the 1950 National Safety Congress.

NEW GOGGLE DESIGN

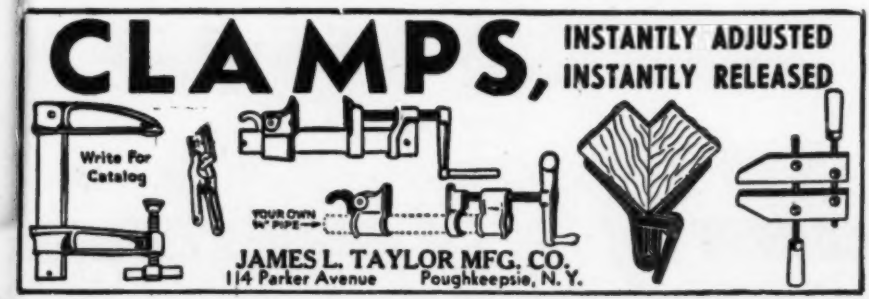
An all plastic safety goggle has been developed under the trade name "Saf-I-Duo." The one-piece plastic lens is removable and interchangeable. It is made from optilite, a new optical safety plastic. Lens are available in clear or anti-glare green.

The goggle frame is of Vinyl, firm and yet pliable. Four types of ventilation are offered. The manufacturer claims that the goggle offers full protection and will fit over personal glasses.

Write U. S. Safety Service Co., Kansas City 6, Missouri.

SAFETY SLOGAN AWARD

"Safety First Rates Supreme Working Alone Or In A Team" was selected as the best slogan in the annual slogan contest conducted at the Passaic, N. J. plant of Manhattan Rubber Division, Raybestos-Manhattan, Inc. The winner, Fred Mondon, was presented with the prize of $100.



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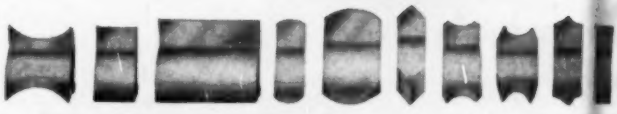

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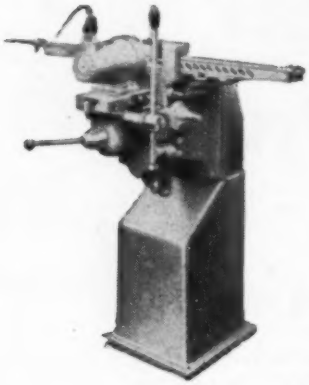

for cutting grooves in window shutters, doors or anything with loovers. The Cutterhead runs at 9000 RPM and can be adjusted to any angle for left or right horizontal and vertical slots. The grooves are cut to a flat bottom, therefore the beveling of the edge on the slots is eliminated. The clamping, the infeed and the grooving is performed with one lever movement. This and the fast cutter-speed makes this a very rapid operating machine.

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"PICTURE WOOD" NOT MAHOGANY

In recent weeks the Mahogany Association has received a number of inquiries about decalcomania or other reproductions of mahogany surfaces. Specifically the question is this: Does a cabinet qualify as genuine mahogany if "all exposed structural parts and plywood faces" are of mahogany but over top or fronts highly figured "picture wood" is added.

The answer is no, in spite of the arguments in favor of such usage. The proponents of this practice contend that the cabinet complies with the rules for naming wood furniture as laid down by the Federal Trade Commission—all exterior wood surfaces are mahogany and the "picture wood" is only a finish.

It is true that the rules established in 1925 do not specifically cover this

Question: What About Steam Humidifiers?

*Answers:**

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- **NO MAINTENANCE**—"They have been operating now for several years without a single bit of maintenance."
- **SATISFIED**—"Well satisfied and eventually will want to install more of them."
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**Ask for names of these, and other, users.*

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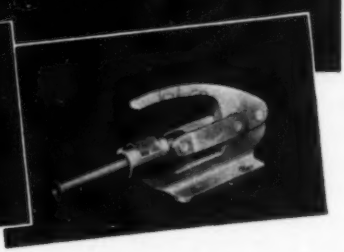

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MODEL 650, right; Plunger Clamp for heavy duty "push-pull" work-holding requirements. Compact design, develops up to 4000 lbs.

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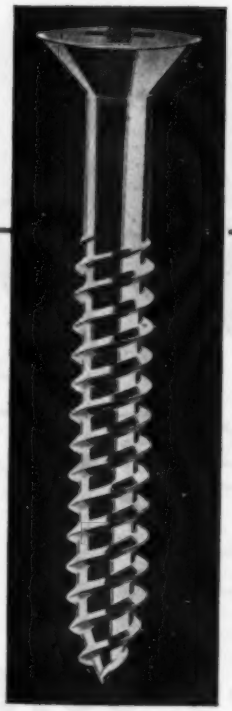
practice as it was not considered at the time the rules were made. However, it is obvious that such a product is capable of deception. The "picture wood" surface is a photographic reproduction of a beautiful mahogany crotch or swirl. The average person would accept the picture as the real thing without question, especially if it were labeled "all mahogany".

This process is simply a modern improvement of the rubber roll or hand graining that was in vogue in the earlier days of the present century. Being a photographic process it is a big improvement in appearance over the most skillful work of the hand-graining artist. It is an exact reproduction of a beautiful mahogany panel.

The Mahogany Association will not issue its official labels or tags for use on cabinets on which "picture wood" is applied. It would also consider it a violation of the penalty contract under which labels are issued if the labels were applied to cabinets of this character.



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WWD Finishing Section

HOT Spraying of Lacquer

BY JAMES A. BEDE

In this article Mr. Bede describes spraying paints and lacquers at steaming hot temperatures. He lists the benefits of the process, what is involved in the spraying and how any manufacturer can use this method. If you have further questions regarding hot spraying, please write to the editor.

EVERY ORGANIC finish — lacquer, synthetic or whatever it may be, is affected by temperature variations. Each one has some one ideal temperature at which it is best applied, and once this ideal temperature is ascertained, the hot spray process enables spraying constantly at this one ideal temperature. The variations and inconstant conditions caused by fluctuating temperatures are eliminated once and for all. This is the first time the finishing industry has had the opportunity to operate constantly at a selected temperature.

Hot spraying of lacquer is within the reach of all those who wish to adopt it. In many plants hot spraying has brought about important benefits. In some cases it has cut finishing costs as much as in half!

For a number of years before World War II, hot spraying of lacquers was regarded with great interest, was talked about by many, tried by a few, but because most of these tests were conducted under incorrect conditions, they were unsuccessful. As a result the idea met with disfavor and was regarded as impractical.

However, it was realized by some leaders in the industry that the theory behind the process was perfectly sound, and that it would bring many benefits if it could be realized.

Recently hot spraying has been revived under corrected conditions and it has now been beneficially adopted in so many plants that there is no longer any doubt as to its feasibility and suc-

Mr. Bede is president of Bede Products, Inc.

cess. Hot spraying is practical, it is very beneficial, and is being met daily with increasingly greater acceptance.

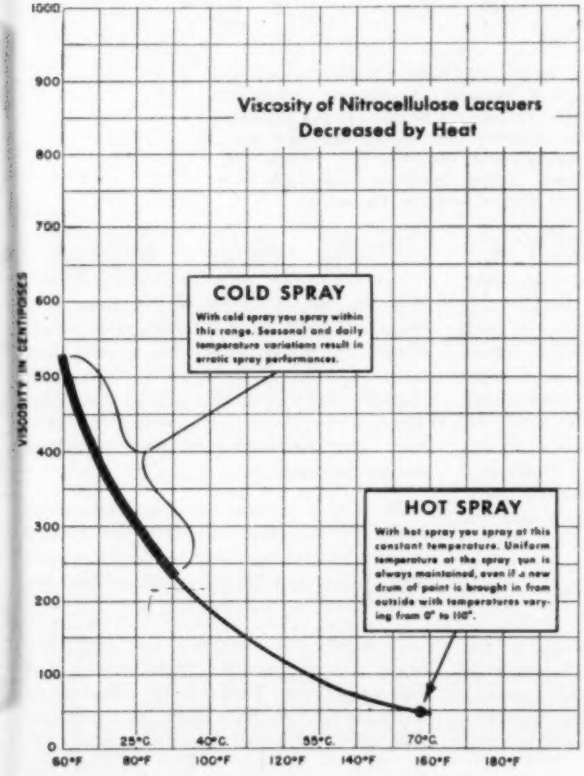
The following actions take place when hot spraying is properly adopted: (1) The viscosity of the lacquer is greatly reduced by heat, eliminating the need for some of the thinners. (2) A uniform condition of operation is established. The lacquer will always have the same temperature and the same viscosity, eliminating the fluctuations that we now normally experience. (3) In the process of atomization, a greater amount of the solvent is dissipated, so that lacquer of higher solid content is deposited on the work.

As a result of these actions, it is possible to obtain benefits such as the following:

There is a savings in labor, thinner, overspray, fewer rejects, less time spent in sanding and polishing and less air is required per pound of solids.

Production increases because uniform temperature is constantly maintained. Spraying time is faster and fewer coats are required. There is no blushing.

Quality is improved because there is greater depth and fullness of finish; less orange peel and surface imperfections are better covered. Greater cold check resistance is possible with the hot spraying method.



Graph showing comparison in viscosities between hot and cold spray.

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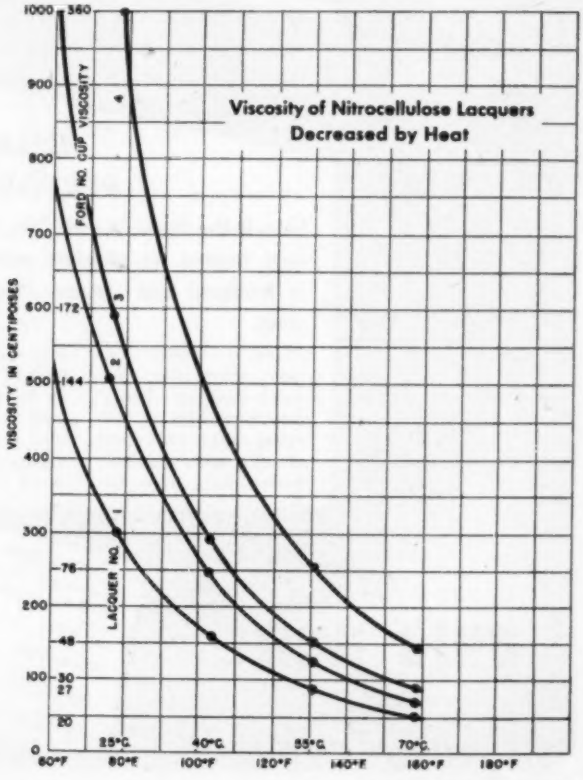
Health hazards are reduced by less spray fog rebound into sprayer's face and a reduction in the solvent fumes which may be inhaled.

Fire hazards are lessened because lacquers and thinners can be stored outside of the building and there will not be as great a problem with solvent fumes being exhausted from the drying room.

The major benefit of the hot spray process is the elimination of a large portion of the waste encountered with the normal method of spraying. Because spray painting is the fastest and cleanest method of painting, the common tendency is to phlegmatically accept or ignore the waste involved. Hot spraying reduces this waste because it lowers viscosity with heat, in effect substituting heat for thinners. This means depositing more solids with less solvents, with less spraying time and with less paint loss due to overspray. This is true for all types of finishes, but let us see what happens with lacquers.

For an average cold lacquer, to reduce one pound of solids to a sufficiently low viscosity so that the spray gun can properly atomize it, the addition of four pounds of solvents is required. In other words, in a five gallon mixture four gallons are solvents and the rest solids. Of course, the solvents are simply a conveying agent which evaporate



This graph shows decrease in viscosity of several lacquers as temperature is raised.

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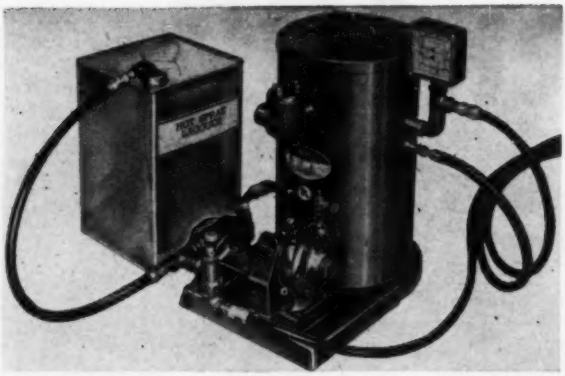


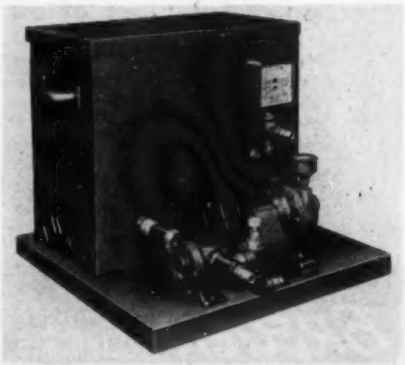
Circulating type paint heater.

and become a complete loss. Furthermore, in spraying it is not uncommon to have 50% of the sprayed mixture lost due to overspray.

With hot spraying, the loss can be reduced approximately by half. Lacquer is generally heated to a fairly high temperature (160°F.) at which its viscosity is reduced to approximately one-fourth of what it was in the cold state. It then requires only from two to two and a half pounds of solvents to carry one pound of solids. A three gallon mixture has the same solid content and covers the same surface area that a five gallon cold spray mixture does. Because the heated lacquer is easier to atomize, the spray gun can handle a somewhat greater volume of lacquer per second of trigger action. For these reasons, there is a distinct possibility of conspicuous savings in labor required to spray a given number of pieces with a given film thickness. In actual practice, the output in the spray booth is doubled in a majority of cases. Furthermore, when the sprayers adjust their spray technique for hot spraying, the paint loss due to overspray is considerably reduced.

Aside from the fact that heating lacquer lowers its viscosity, there is another important physical action to consider. The ratio of solvent lost in the process of atomization is greatly increased. In cold spraying, approximately 20% of the solvents in the lacquer that is being sprayed is driven off in atomization. The amount varies according to the distance the gun is held from the surface, the air pressure, the humidity in the air, etc., but in any event the lacquer deposited on the product surface has a higher solids to solvent ratio than when it left the gun.

When lacquer is heated to 160°F., the solvents are near their boiling point. Therefore a much greater percentage of solvents are lost in atomization — as much as 60% or more. This



Double unit Bede heater designed for larger installations where two or more spray guns are used.

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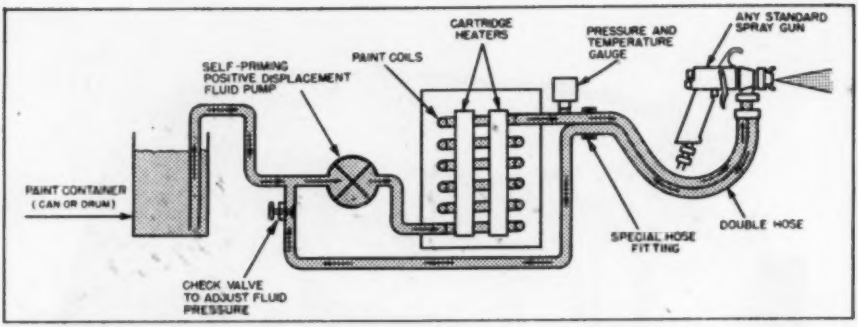

Flow diagram through circulating type paint heater.

is very desirable, provided the remaining solvents carry the burden of sufficient flow and leveling action of the lacquer.

By spraying lacquer hot, the finisher can duplicate the build and spray performance of other finishes quite readily. One handling, one trip through the spray booth, will accomplish in many cases that which normally requires two separate spray operations.

The hot spray process increases the utility of lacquers. Lacquer as a finish has some marvelous qualities. Of special interest to the consumer is the fact that it gives a hard, durable finish of lasting beauty. In the factory it is easy to apply and easy to touch up and repair, for it dries before dust and dirt can settle. Unfortunately lacquer needs large amounts of solvents to reduce it to spraying viscosity, and multiple coats are needed to obtain adequate film thicknesses. With the hot spray process there is less material cost and greater labor productivity. In a majority of cases, multiple coats can be eliminated.

There are further benefits to be derived from the hot spray process other than to increase build and solid content. One is the reduction of overspray by taking advantage of heat as a viscosity reducing agent and spraying with the lowest possible atomizing air pressure. It is also possible to obtain a finish with greater depth and better flow out, which requires less sanding and polishing. That annoying seasonal problem, blushing, is eliminated without special retarders.

An additional benefit from the hot spray process is a more durable finish for wood finishing than is practical with cold spray.

To successfully hot spray lacquer, there were a number of major difficulties to overcome. First there was the development of a safe and thoroughly practical lacquer heating unit. The second problem was the development of better hot lacquer formulas. The third and most difficult of all, was over-coming the skepticism created by previous failures.

A practical, simple and safe lacquer heater had to be developed — one not too difficult for the sprayers to use.

There are a number of efficient lacquer heaters on the market.

It was also necessary to develop a practical, trouble-free circulating mechanism to circulate the lacquer through the heater to the spray gun and return. The noncirculating heater is not adaptable for lacquer use except in rather isolated cases. To develop a circulating mechanism, however, was not a simple matter. Pumping hot lacquer presents

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a number of problems. For example, to keep the shaft seal properly lubricated was quite a problem due to the heat generated and the hot solvents coming in contact with the seal. A circulating system also had to be devised to enable the pump to operate slowly, because the hot lacquer does not have the lubricating property that cold lacquer has, and therefore, pigments in hot lacquers have a much greater abrasive action than with a cold lacquer. Another critical problem to be solved was finding a fluid hose which would stand up under the hot solvents. The ordinary thiokol-lined hose commonly used was found inadequate. These hoses would swell causing an interior restriction. Hence their life was not only short, but they gave a highly erratic performance because of unreliable material flow. This has now been overcome and there are fluid hoses now on the market which will perform efficiently when used with hot lacquers.

Along with the development of heaters, however, great progress has been made in the development of better hot lacquer formulas. In the interest of developing more information on hot lacquers, an extremely valuable contribution has been made by one of the large manufacturers of nitrocellulose. This concern, who supplies raw materials to lacquer manufacturers, has, for over a year, been conducting thorough and elaborate tests on hot spraying of lacquer. Every important detail in which lacquer manufacturers and finishers would be interested was covered by this program. Recently this firm made the findings of the analysis available to all of the lacquer manufacturers. As a result, better hot lacquers are now being formulated.

As is to be expected, there are some who have recently tried hot spraying of lacquer and found it impractical. It is erroneous to assume that hot spraying

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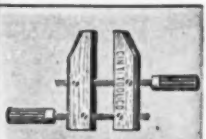

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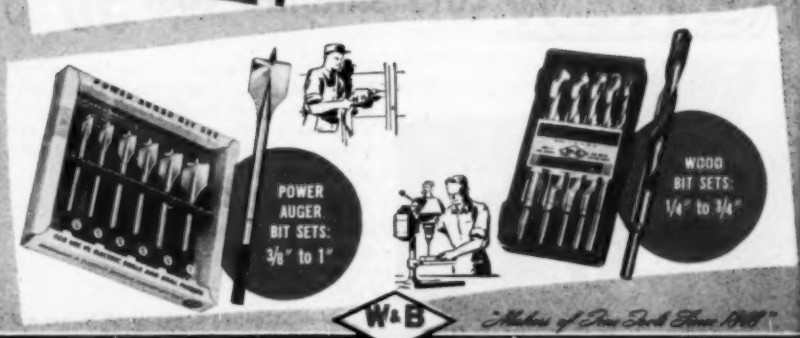

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is an automatic success. To properly adopt it, three basic steps should be considered and each step must be carried out thoroughly.

Step number one is a lacquer formulated for hot spray and adjusted to the proper consistency with the right type of solvents.

Second, the right type of paint heater should be selected and properly installed.

Third, the finisher must approach the hot spray process with an open mind and be prepared to adjust his spray technique correctly to take advantage of this process. This last point is probably the most important for the finisher to observe. Spraying hot material requires a special technique which should be mastered by the spray operator before attempting production spraying.

There are two systems for adopting the hot spray process. One is to make the transition to high temperatures immediately. The second is to approach it gradually. If the first method poses too many complications, it is advisable to start at a modest temperature setting; such as 110°F., and increase the temperature settings in five-degree stages, each time making compensating adjustments in viscosities and atomization pressures. In this manner, the operators have a chance to adjust themselves gradually to the new process.

The hot spray process is applicable to all types of organic finishes, lacquers or synthetics, but carries greater benefits with those finishes that require a proportionately larger percentage of solvents to reduce them to a workable consistency. This process can, in round figures, effect savings of 25% to 50% in the overall costs of finishing with lacquer. That is why hot spraying is now being adopted all over the country at such a rapid rate.

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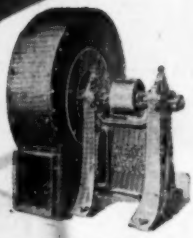
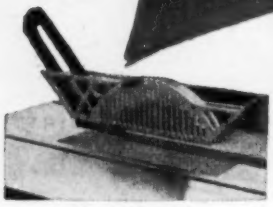
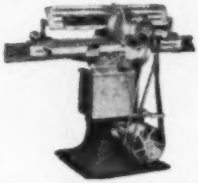


Exhaust Fans



Saw Guards

Sander Felt



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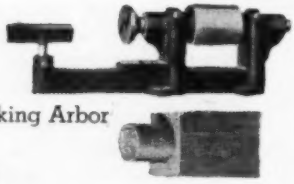
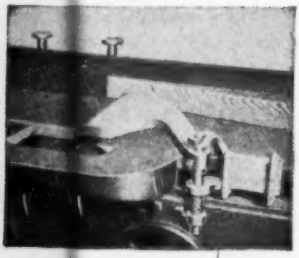
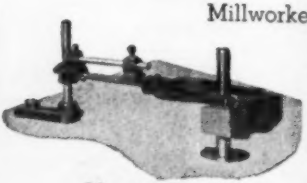


Chucking Arbor

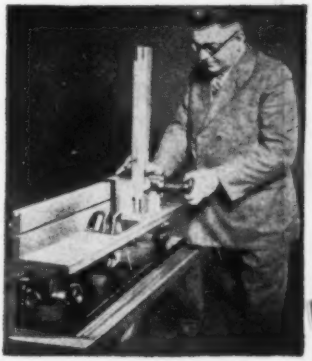
Jointer Guards





Shaper Guards

Millworker



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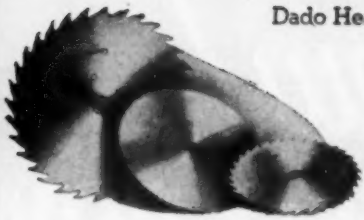
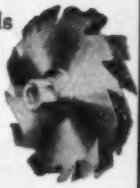


Dado Heads



Circular Saws

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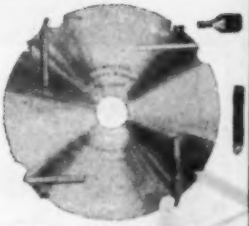
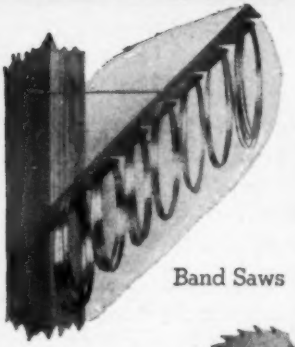
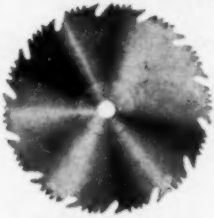
Groovers



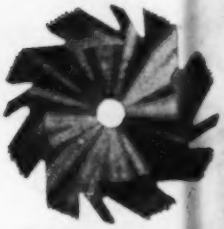
Inserted Groovers



Band Saws

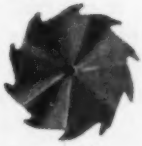


Planer Saws



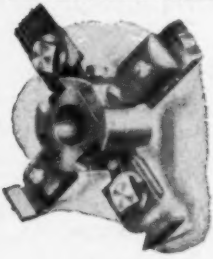
Patent Groovers

Rabbeting Saws



Common Groovers

Mattison Dado Heads



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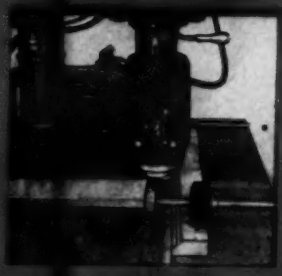

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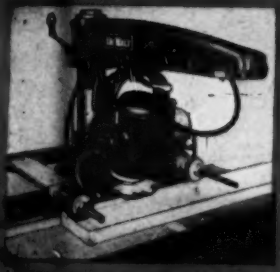

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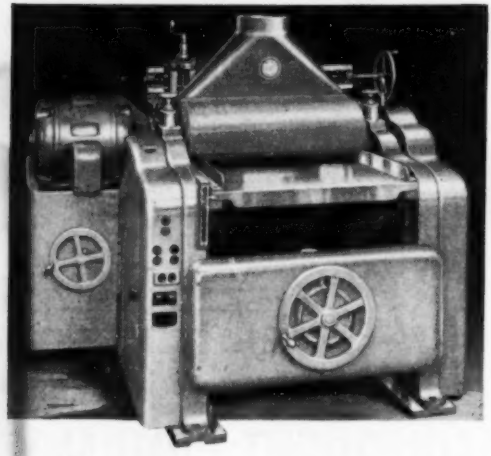

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DRUM SANDING TECHNIQUES

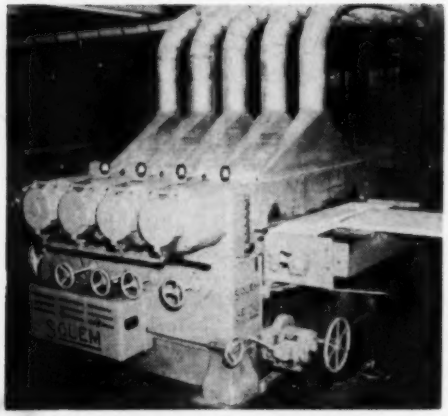
BY MARK HOEPER

IT MIGHT be interesting to point out that the earliest successful power feed drum sander was produced about 1877 and a picture of it looks more like an old fashioned glue spreader than a sander. In the past 70 years many different models of machines for sanding flat surfaces have been developed and marketed and have contributed to the economical manufacture of many different products, not only in the woodworking field but in various other fields including such items as wallboard, decorative wall tile, cork, rubber, leather, etc.

Drum sanders have been produced in both roll feed and endless bed types, and in both the single deck and double deck types. The endless bed machines are now offered in four-drum, three-drum and two-drum types and, occasionally some endless bed machines have been produced in a single drum type. Sales of two-drum machines are quite small and are usually limited to very small companies who have limited production and small capital for production that does not require a fine finish. In 1945 the Solem Machine Company first started to market their four-drum endless bed sanders. Now about half of the sales of endless bed sanders are of the four-drum type.

The most vital part of any sander is the drum which carries the abrasive material, and in effect forms the cutterhead of the machine. The drum must not only have a true surface, but it must have dynamic balance and must hold the abrasive material securely. The dynamic balance requires special equipment because besides rotating at 1200 or 1800 rpm, the drums are also oscillating at rather high speeds. A few years ago 145 oscillations per minute was quite standard, but oscillations have now been stepped up to 230 times per minute, with a decided improvement in the resulting finish.

On many types of sanding work, the use of four drums instead of the conventional three drums, has permitted a considerable reduction in the amount of subsequent belt sanding. The use of four drums has actually resulted in sandpaper economies, by avoiding the rather common tendency to crowd the abrasive sheet. Dividing the abrasive cut among four drums instead of three drums usually results in getting much longer life from the abrasive material. Where the abrasive is crowded too much, the abrasive grains are subjected to stresses that fracture them long before they are dull. Several of the manufacturers of abrasive sheets have very excellent engineers who are frequently able to offer suggestions as to type of abrasive and grits used, that will result in substantial economies in ultimate cost, notwithstanding a higher price that may be charged for the abrasive recommended. With the present high labor rates, some saving is also available by reducing the frequency with which the

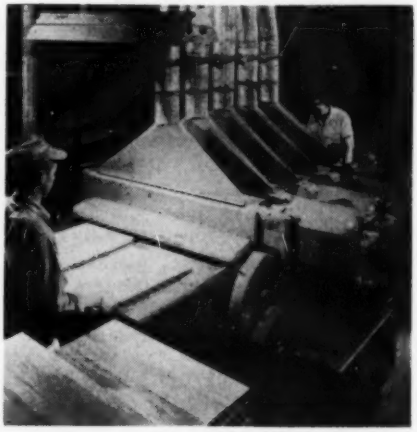


Close up of the four drum sander.

abrasive material must be replaced, but it is false economy to run abrasive material that has broken down. Frequently, the user of a four-drum machine also finds that somewhat higher feed speeds are possible without any sacrifice of quality and this spells real economy too because of the high wage rates that are now in effect for the operators of such machines. For certain types of sanding work, 1200 rpm motors mounted directly on the drum shafts give the best results. For other types of work, 1800 rpm motors on each of the drums works out to better advantage, and in many cases, it is found desirable to have the 1200 rpm motors driving the first two drums and 1800 rpm motors driving the last two drums. Twelve hundred rpm gives a cutting speed for the abrasive of about 3400 feet per minute, compared to 5200 feet per minute with 1800 rpm motors.

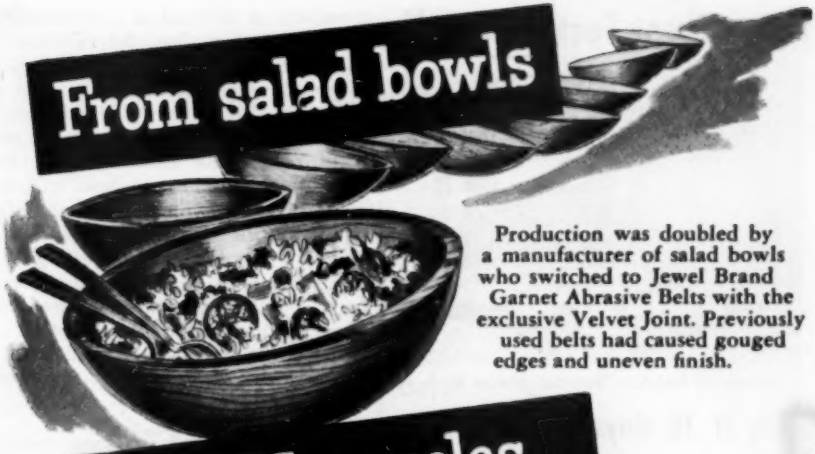
The older designs of machines are much lighter and rather frail in construction compared to the modern designs. Prior to a time when adequate dynamic balancing equipment was available, it was quite common to see a drum sander operating and creating enormous vibration, sometimes even shaking the whole building. Mere weight in a machine is not the entire answer to the problem, but the proper distribution of weight and the dynamic balancing of the drums, and machine tool accuracy in the production of the various parts, has overcome these older difficulties. Of course, modern design with built-in motors and with the rotors of the motors mounted directly on the drum shafts, instead of the older coupling type of drive, plus the selection of ample ball bearings for the rotating parts, has contributed a great deal toward the elimination of vibration. This has also helped materially to get better sanding at faster feed speeds, and consequently greater economy in sanding production.

On the endless bed type of machine it is important that the bed with its rubber cushion face be accurate and means provided for perfectly parallel alignment between the face of the bed and each of the sanding drums. The bed must feed smoothly and present a perfectly flat face to carry the stock through the machine. The lack of competent help sometimes results in quite



A Solem four drum sander in operation.

From salad bowls



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a variety of difficulties in operation, so it is imperative that the operator responsible for one of these machines be thoroughly instructed in its care and operation. Sometimes difficulty occurs because of a tendency to use too much pressure on the stock that is being sanded. Sometimes a lack of ample exhaust facilities results in faulty elimination of the sanding dust and if the bed is not kept free from the accumulation of sanding dust, difficulties result from imperfect feeding. Where inadequate exhaust facilities prevail, the situation is improved considerably by a power driven brush unit for keeping the bed clean.

The drums used in these machines are commonly of two types: the so-called spiral type which uses 24" width of abrasive paper spirally wound on the drum and tensioned at the ends of the drum and the straight or "shear-cutting" type of drum, which uses 36" abrasive paper regardless of the width of the machine. The 36" dimension is appropriate for the distance around the drum and into the paper clamp, and a separate mechanism is provided for constantly holding the tension and taking up any stretch in the paper. For production that does not require the use of abrasive sheets of a grit coarser than No. 2½, the preference is usually for the type using the 36" paper as this type of drum requires less time for renewals of the abrasive sheet.

Mr. Hoeper is vice president of the Solem Machine Company, Rockford, Illinois. This speech was presented during the Fall Midwest Section meeting of the Forest Products Research Society.

The End.

The men who try to do something and fail are infinitely better than those who try to do nothing and succeed.

— Lloyd Jones

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WOOD New Literature Section...

FOREST PATHOLOGY, by J. S. Boyce. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 550 pp. $6.00.

Here's a working guide for preventing, detecting and combating diseases of forest trees in the U. S. and Canada. A practical tool for lumbermen, foresters and timberland owners, this book brings you concise data on the relationship of decay to scaling and estimating timber; rate of deterioration of dead timber; deterioration of forest products by decay and stain; principles of forest disease control—root diseases, etc. Thoroughly revised and rewritten this guide concentrates information on a given disease or group of diseases in separate sections. It makes specific facts and data on prevention and control easy to find and use.

TAG MIDGET MOISTURE METER

The Tag midget moisture meter, specially designed for instantly determining the moisture content of wood, lumber, plaster and wood products, is described in a new six-page bulletin issued by the Tagliabue Instruments Division. The bulletin describes the meter's design and construction and explains its varied uses in testing lumber and wood products, plaster in walls and ceilings and all interior and exterior woodwork.

Write for bulletin No. 1295, above company, Dept. 67, Weston Electrical Instrument Corporation, 614 Frelinghuysen Ave., Newark 5, N. J.

SELLING TO THE GOVERNMENT?

Of interest to many in these days are the products the Government is buying and the specifications they require for those products. Casco Service Bulletin No. 82 "Government Procurement of Wood, Plastics and Paper Products" gives pertinent information concerning this timely subject. Lists purchasing offices, includes complete specification charts and tells how to estimate glue costs. Also the names of publications which list purchasing offices and items they procure for the various Departments of the National Military Establishment are given.

Write the Borden Company, Chemical Division, 350 Madison Avenue, New York 17, N. Y.

MULTI-RIP SAWS

An illustrated bulletin is now available which features the heavy duty and the standard model Alden all purpose self feed multi-rip saws. The heavy duty saw is designed for gang, single and all purpose straight ripping. Both are sturdy, compact and of all steel construction with fully precision ball bearings.

Write the Bates Mfg. Co., Joliet, Illinois.

INFEED ATTACHMENTS

Ekstrom, Carlson has issued a bulletin, No. A100, describing their new infeed attachments for jointers, shapers and variety saws. These machines, long

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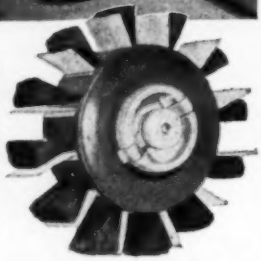

The Sand-O-Flex is being used here on a portable electric hand drill. Use it on your present power tools—either portably or stationary. Four sizes for an unlimited number of industrial applications.

Over a quarter of a million Sand-O-Flex brush-backed sanding wheels are in use today, performing all types of difficult sanding jobs that were formerly done only by hand. Sand-O-Flex gets down into hollow places and over contoured, irregular surfaces with ease.

Sand-O-Flex consists of replaceable brushes mounted on the outer rim of a metal wheel. Strips of abrasive cloth unreel from the central magazine and are backed by the brushes which cushion the abrasive and mold it to the work shape. When rotated at recommended motor speed, you get approximately 14,000 *sanding strokes per minute!* Compare this with hand sanding.

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regarded as dangerous machines, may now have a combined safety device, semi-automatic power feed and effective holddown in these new infeed attachments. Complete table of specifications is also given.

Write Ekstrom, Carlson & Co., 1400 Railroad Ave., Rockford, Ill.

BERTHELSEN HOT PRESS

New designs, distinct advantages, and complete specifications are contained in an illustrated bulletin describing the Berthelsen "VB" hydraulic automatic hot press. Among the new designs are transverse welded frames; the hydraulic system mounted as a complete unit on the side and beneath the press plane to allow free space all around the press; and an automatic timer which automatically releases the hydraulic pressure and opens the press at the end of each press cycle.

The new design also makes it possible to manufacture panels longer than the press by progressive gluing operations. The limit of the panel width is the width of the press.

Write the above Company, Dept. WD, P. O. Box 1423, Joliet, Illinois.

DUST CONTROL SYSTEMS

Detailed selection, operation and maintenance data for the plant engineer responsible for dust control is contained in a 50 page, pocket-size book, "Industrial Dust Control Through Exhaust Systems," offered by the Pangborn Corporation, Hagerstown, Md. The book treats, in three major sections, exhaust hoods and piping systems, dust collecting equipment and exhausters and drives.

It is not an engineering textbook but a general descriptive outline prepared for the purpose of acquainting plant executives with the means of controlling industrial dusts at the source of production through the medium of exhaust systems. To make the book specifically helpful, a detached problem sheet is included on which the reader can enter data particular to his case.

Write Dept. WD, above company.

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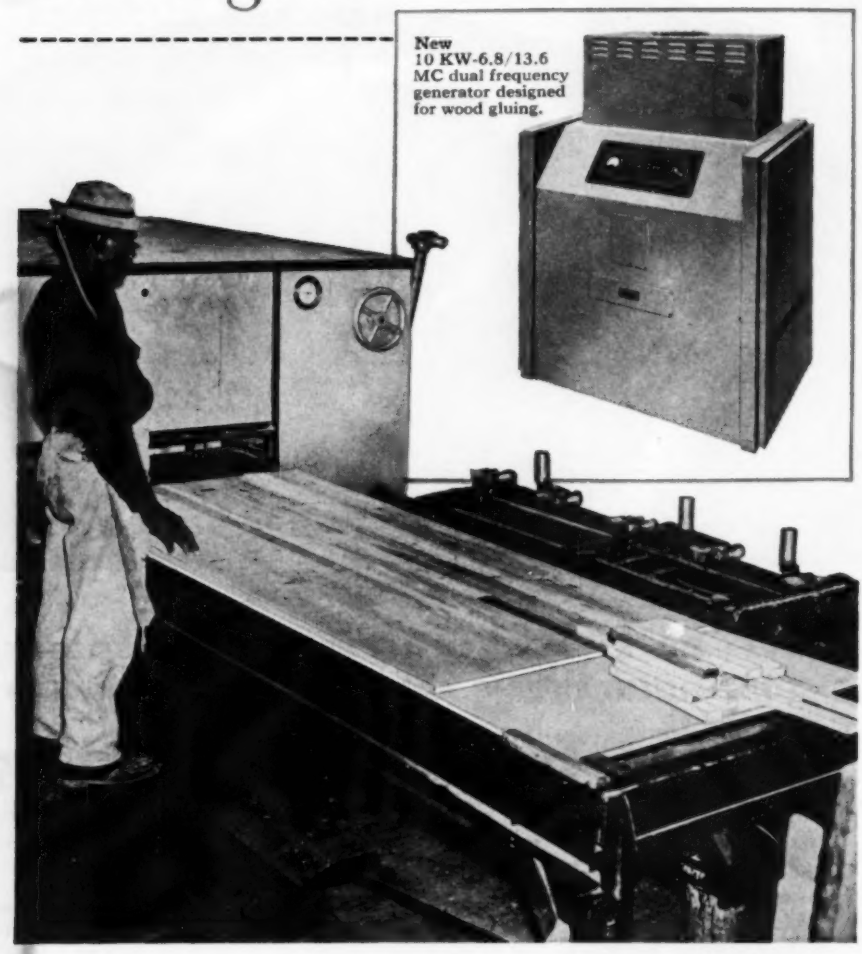

A Westinghouse 10KW-5 MC generator and a Weldon-Flinchbaugh panel press produce phenomenal savings in costs and materials at Bradley Plywood Co.

Part-Time SAVINGS

$26,000

A YEAR!

RF gluing equipment is used in new, efficient and productive ways by Bradley Plywood Company, Savannah, Georgia. For one day a week Bradley's RF equipment glues scrap wood salvaged by them to make lumber core panels, desk-top cores and other items.

On scrap-wood gluing alone, Bradley saves $26,000 a year!

Bradley spends the other four days a week on RF gluing of core-stock panels from standard size lumber. With RF heating, production has tripled, costs have been halved.

For full-time operation, the $26,000 scrap-wood savings plus an annual saving of more than $36,000 in normal operations paid for the installation in less than three months. There have been added benefits: fewer rejects, less glue, less planing, less floor area.

Today, scarcities demand savings. For savings information, call your Westinghouse representative. Or write Westinghouse Electric Corporation, Department W-3, 2519 Wilkens Avenue, Baltimore 3, Maryland; ask for the booklet B3946B covering *"RF Heating for the Woodworking Industry."*

Westinghouse

RF HEATING

J-02225

CLAMP BULLETIN

The Union air-operated revolving case clamps, equipped with self-aligning ball bearings are illustrated and described with complete specifications in this bulletin. Of sturdy, all steel construction, they maintain positive alignment regardless of pressure, we are told. All models are available with either hand or foot-valve control. The clamp may be revolved to any angle and is equipped with locking device for positive positioning.

Write the Union Tool Corp., Dept. WD, Warsaw, Ind.

INDUSTRIAL RESEARCH NEWSLETTER

A new bi-monthly publication, Industrial Research Newsletter, will present information for executives, research directors, and technical personnel on scientific, technological and engineering developments. The content will reflect the important place assumed by industrial research in the American economy. Selection of items will be based on interest, service to readers and significance and will come from a wide variety of sources.

Write Armour Research Foundation of Illinois Institute of Technology, Technology Center, Chicago 16, Illinois.

HYDRAULIC CYLINDERS

Catalog No. 200 presents the Logan Rotocast hydraulic cylinders. Designed for operating pressures up to 1500 p.s.i. these cylinders combine many improvements in design and construction which make for greatly improved performance and appearance. The many different types and combinations of mountings that are available give these cylinders an unusually wide range of applications wherever dependable, economical power is required for pushing, pulling, lifting or holding operations. Technical and engineering data have been given to enable one to find the cylinder that would best fit their requirements.

Write the Logansport Machine Co., Inc., Dept. WD, Logansport, Ind.

A.W.P.A. ANNUAL PROCEEDINGS

The 1950 issue of the annual "Proceedings of the American Wood-Preservers' Association" is now being distributed. A feature of this year's volume is a ten-year index. The volume includes committee reports, contributed papers and resultant discussion presented at the association's annual meeting held in Houston, Texas, last April. Among the technical papers presented were: "Use of Pressure Treated Ties," "The Wood Preserving Industry and Its Principal Raw Material, Timber" and "Drying Lumber by the Vapor Process." Decision was made to hold the next annual meeting in Chicago next April.

Write the American Wood Preservers' Association, 839 Seventeenth St., N.W., Washington 6, D. C.

M.F.M.A. HOLDS 54th ANNUAL MEET

At the 54th Annual Meeting of the Maple Flooring Manufacturers Association, Chicago, W. C. Abendroth was re-elected president; D. S. DeWitt, Oconto, Wis., vice president; W. W. Gamble, Jr., White Lake, Wis., treasurer and L. M. Clady, Chicago, secretary-manager.

The manufacturers were told during the meeting that, barring unforeseen regulations, 1951 should provide a ready market for their products.

PLANER AND MACHINE BULLETIN

The 412 planer and matcher, manufactured by the S. A. Woods Machine Company, is featured in a fully illustrated, descriptive bulletin. This machine is shown in the belt driven and motor driven models, with complete specifications. Simplified roll tensioning and hoisting mechanism for feed-in and feed-out rolls, push button control conveniently located for each motor, unique binder construction with automatic tensioning device and other advantages are given.

Write above company, Dept. WD, Boston 27, Massachusetts.

CONTROLLED AIR POWER DEVICES

The production possibilities of controlled air power and the ways it can be used in many different operations are illustrated in Bulletin CL-30 released by the Bellows Company. Controlled air devices are claimed to cut costs and speed up production by reducing the number of manual operations, by speeding up idle machine or tool travel, by reducing worker fatigue. Bellows controlled air devices are illustrated with complete descriptions and specifications.

Write the above company, Dept. WD, 222 W. Market St., Akron, Ohio.

THE NATION'S WOOD SUPPLY

"In war and in peace this nation's forests have met and are meeting the demands made upon them." This is the conclusion reached in a newly published 24-page appraisal of "The Nation's Wood Supply" now being distributed by American Forest Products Industries.

Using photographs and charts, the attractive booklet reviews the progress in forestry and forest management made in the United States during the last half century. Facts and figures used in the publication are based on official forest statistics published by the federal government. The booklet was planned and compiled by leaders in the lumber, pulp and paper, plywood and allied industries.

Write the American Forest Products Industries, Inc., 1319 Eighteenth St., N.W., Washington 6, D. C.

PORTABLE TOOL CATALOG

Complete specifications of tools comprising the portable tools for industry are presented in a new condensed catalog issued by Cummins Portable Tools. Included in the catalog are drills, saws, disc sanders and a list of accessories.

For a copy write above company, Dept. WD, 4740 Ravenswood Ave., Chicago 40, Ill.

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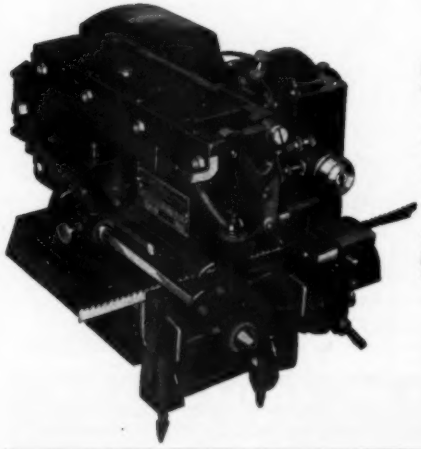

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Write for Bulletin K 5 Wardwell Band Saw Filing Machine. Wardwell Mfg. Company, 3161 Fulton Road, Cleveland 9, Ohio

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Spindle Speeds	20,000 rpm	10,000 rpm 20,000 rpm
Work Table Size	20" x 26"	24" x 36"
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Collet Capacity	½"	½"

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Comparative Steam Losses in Dry Kiln Buildings

BY JOHN B. WELCH

IT IS generally recognized, of course, that a dry kiln housing should be properly insulated to save on the steam consumption and on fuel, but just how much the savings might amount to if a poorly insulated building were to be properly insulated is often hard to determine.

Perhaps the best way to arrive at an answer is through the comparison of records taken on two separate kilns, each operated on a daytime schedule only. That is, where the heat is maintained at the correct setting during the day and then turned off until the next morning.

Both kilns selected for the test were Standard Dry Kiln Company installations. Both included Standard's internal fan system, with full automatic control of the heat, humidity and ventilation, operating in the summer months—at about the same time. One of them, located in Arkansas, had a very poorly insulated roof and wooden doors. The other, in Michigan, had a very well insulated roof and also had the Standard heavily insulated doors with aluminum sheets on both sides of the thick, vapor-proof insulation. Charts from both kilns were selected, showing their very close operating temperature condition requirements during daytime operation.

What happened, by comparison, is illustrated very clearly by the accompanying chart. The dotted line, marked "A," shows the well-insulated installation's record, and the solid line, "B," shows that of the poorly insulated installation.

It is particularly interesting to note that, after being shut off for the night, the well-insulated building did not cool off as much nor at as fast a rate as did the poorly-insulated building. Consequently, when the heat was turned on in the morning, the heat came up to the setting in a very short time under good insulating conditions. In the other installation, the temperature dropped anywhere from 12 to 17 degrees more every night, and naturally was slower coming up to the required temperature.

When the kilns were shut down, there was a very rapid drop in temperature for the first hour in the poorly-insulated building, and while the temperature drop was rather rapid also in the other building, it was not at such a great rate of speed. The final cooling temperature

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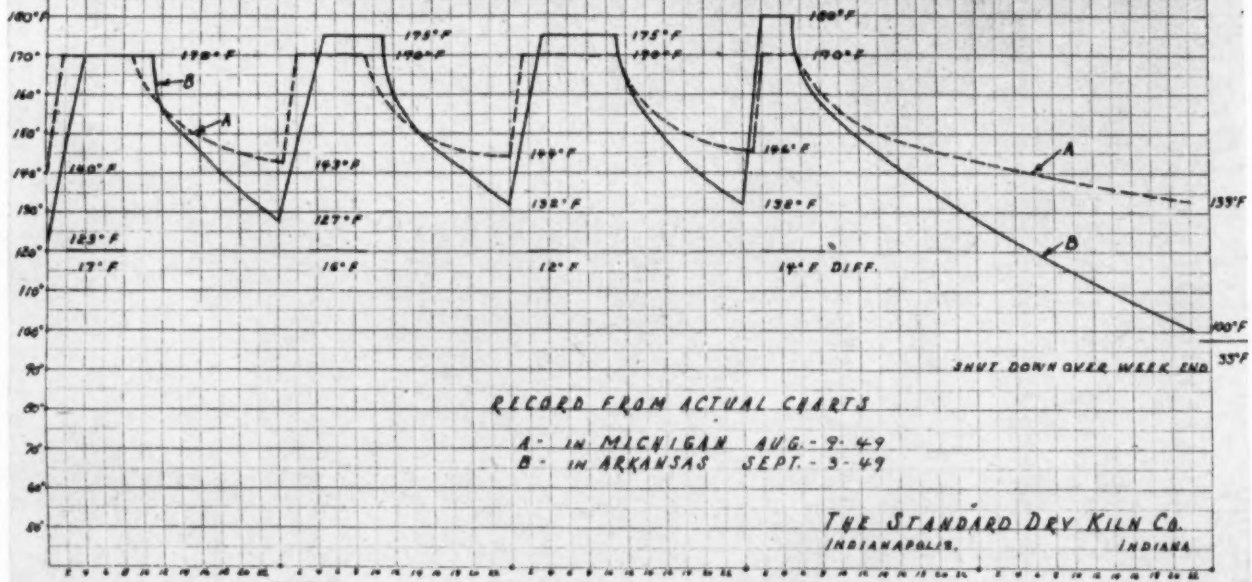
INTERNAL FAN KILNS WITH AUTOMATIC CONTROLS
FOR HEAT- HUMIDITY- AND VENTILATION

'A' - TEMPERATURE DROP WITH WELL INSULATED ROOF - DOTTED LINE
'B' - TEMPERATURE DROP WITH POORLY INSULATED ROOF - SOLID LINE

QUICK PICKUP TO HEAT IN BOTH CASES, BUT FASTER WITH WELL INSULATED ROOF.
FAST COOLING AND TOO MUCH LOWER TEMPERATURES WITH POORLY INSULATED ROOF, RANGING FROM 12°F TO 17°F DURING WEEK AND 33°F OVER WEEK END.



RECORD FROM ACTUAL CHARTS

A - IN MICHIGAN AUG. - 9 - 49
B - IN ARKANSAS SEPT. - 3 - 49

THE STANDARD DRY KILN CO.
INDIANAPOLIS, INDIANA

in the morning was considerably less for the well-insulated building.

Week-end records are interesting, too. During the same relative shut-down period, the poorly-insulated building cooled off 33 degrees more than the well-insulated building. Of course, the greater the cooling off, the more fuel it takes when starting up to re-heat the kiln to starting temperatures.

In these tests, both kilns showed a very fast pick-up, regardless of insulation, and of course radiation can be added to give even faster pick-ups. To do this, however, increases the cost of radiation and furthermore does not permit the best performance of the coils when a kiln has a great excess of radiation for operation under normal temperature and humidity conditions during the daytime. While a reasonably fast pick-up is desirable for day-time drying, it should not be overdone.

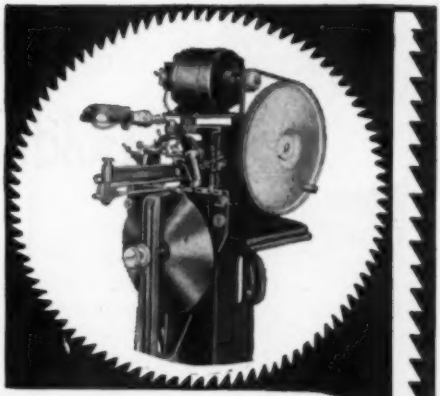
The tests, as illustrated by the chart record, showed that to save fuel by reducing steam consumption, a kiln building should be well insulated on the roof, and have well insulated doors that are tight fitting. Having inside walls of the structure coated with heavy plastic or kiln paint to keep the walls from absorbing moisture, thus transmitting heat losses through the walls, is also a highly recommended practice.

If steam costs anything, and it is generally rated at 75c—$1.00 per thousand pounds at a mill, then these steps should be utilized by all desiring to reduce operating costs. Doing so will also make considerable savings in the fuel bill, an item well worth checking carefully.

The End

Usually a pessimist is a man who financed an optimist.

— Joker



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WHAT ARE SPECIFICATIONS AND USES FOR WOOD FLOUR?

As a special service to our readers, this Forest Products Research Clinic will appear in each issue of WOOD WORKING DIGEST for the next several months. It will cover any subject from logging through finishing in the woodworking industry. Specialists in various fields will answer your problems. If there is some matter you would like to have discussed, please send your problem or question to WOOD WORKING DIGEST, Research Clinic Editor. This month's report has been prepared by L. H. Reineke, Technologist, Forest Products Laboratory.

The finest fragmentation of wood scrap results in the material known as wood flour, having a particle size of 20 mesh and finer; some flour is produced having a maximum particle size as small as 200 mesh. Even finer flour has been made.

The starting material for wood flour should be as fine as possible, since much power is required to grind the wood to the fine sizes required. Hence the fragmentation that has already taken place with shavings and sawdust is advantageous to the production of wood flour, so they are the materials commonly used. Only 2% of 40 mesh particles can be screened from sawdust, so that little flour can be derived from this source without grinding. Sander dust is, of course, of suitable size and can be used directly, or without screening only, for some uses, but the presence of grit particles that would abrade dies prevents its use in molded products.

Only a small part of the wood flour production is made from material ground in a green condition, for special purposes. Most wood flour is produced by grinding dry material 6 - 10% moisture content. Driers are sometimes used when the wood fiber plant is an adjunct of the plant furnishing the raw material, but when the raw material is purchased from outside sources, dryness is normally required. Bark-free softwoods of a single species (usually the soft pines) are most desired, especially when the flour is destined for use in light-colored products. Some bark is permitted in flours entering dark-colored products or when color does not matter. Some hardwood, particularly hard maple, is used for wood flours used for polishing or cleaning

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purposes. Several fairly exhaustive treatises on the preparation and uses of wood flour are available. The demand for wood flour is substantial, but suitable raw material is scarce, since few strategically located plants can produce material of the proper purity of species and cleanliness. Sources now beyond economical shipping limits may be able to enter the field by baling the material to permit carloadings in excess of minimum weights. Freight rates on such material are less than for wood flour and it is therefore advantageous to ship the raw material to a wood flour plant at the consuming center rather than shipping the flour to the market from a distant wood flour plant.

The consumers of wood flour individually set their own specifications for the wood flour they buy, but most purchases are made on samples. As a result, and because of the wide variety

in properties desired, wide differences are found in wood flours. Species, color, resin content, cleanliness, particle size are found in wood flours. Species, color, and shape, absorbency, bulk density, and freedom from "shiners" (splinter-like particles) may be important in varying degrees for a given use. For use in linoleum, resin content is important and a light color is required for the light colored linoleums. For plastics, low resin content, fine mesh, and freedom from shiners are needed in making light colored molded products, although color is secondary where dark plastics needing strength and shock resistance are to be used. Color is unimportant in foundry use in moulding sands or on the parting surfaces of moulds, but in dynamite, where highly absorbent, fluffy flour is desired to carry the nitroglycerin, a light color is desired because it is common among users to judge the age of dynamite by its color.

Easy's

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Easy's genuine reciprocating action duplicates expert block sanding—but *five times faster*. *Easy* sands up to moldings, leaves no curlicues, chains or other abrasive patterns. *NO HAND CLEAN-UP!* New positive drive gives full stroke of pad regardless of pressure applied, cuts faster.

Easy's a production machine—not a toy, twice the work area of some sanders. New velvety smooth operation reduces operator fatigue and a world-wide reputation for durability is your assurance of long life and trouble-free performance.

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Absorbency is also required in flour for cleaning and polishing of furs and small metal parts, but high density and sharp-edged particles are preferred to fluffy ones.

The different properties and physical characteristics needed are obtained through proper selection of raw material and milling methods. The coarser meshes, down to 80 and sometimes 100 mesh, are ordinarily produced in hammer mills, but meshes finer than this are milled in attrition mills. Preliminary hammer milling often precedes attrition milling. Swedish attrition mills are commonly stone mills, similar to mills used for grinding grains, but most American attrition mills are of the single or double disc type employing revolving metal discs fitted with grinding surfaces having radially-cut teeth of many patterns, the tooth pat-

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SPEEDS PRODUCTION
IMPROVES QUALITY

You can do a better job in less time when knives are precision ground on a Benedict.

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tern exercising some control over the type of flour produced.

The manufacture and sale of wood flour is a highly specialized field and the operation of a wood flour plant as an incidental adjunct to another wood processing plant generally is not successful. An expanding market can be expected even though new substitutes for wood flour, such as soybean flour as a glue extender, are likely to give increasing competition. The low cost and versatility of wood flour combine to assure it a continuing market, and new uses are being found, such as its use in dry batteries, as a thickener in paint removers, and a recent undisclosed use for wood flour made from balsa. New processing methods for electrostatic removal of bark from wood flour, pulverizing to hitherto unobtainable particle sizes, and the manufacture of wood flour from high grade

Just because Joe enjoys a good stogie, he shouldn't assume Mary enjoys one, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little.*

Gits oil cups have been the standard for industry for more than 40 years. Gits Bros. has the largest selection of oil cups available anywhere. Call on Gits Bros. for a prompt, efficient solution to your lubrication problems.

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pulp are being investigated.

This report is a part of a comprehensive paper on the use of fragmented wood residues and presented by Mr. Reineke at the Virginia-Carolina Section of the Forest Products Research Society Fall 1949 Meeting at Durham, N. C.

Answers will be presented to other forest products problems concerning equipment, methods or materials at the Annual National Meeting and International Forest Products Industry Show to be held the week of May 7th through 13th, 1951 at the Convention Hall in Philadelphia. Information about this important international event may be obtained from the 1951 Annual Meeting Committee, Forest Products Research Society, Two Columbus Circle, New York, N. Y.

A censor is a fellow who knows more than he thinks you ought to.

VENEER, PLYWOOD AND LAMINATED WOOD SECTION

FEATURES

Plastic Surfaced Plywood

Veneer & Plywood

Manufacturing at the
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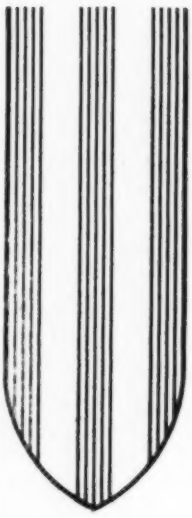

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SEE PHONE BOOK

PLASTIC

SURFACED DOUGLAS FIR PLYWOOD AND USES

BY JOHN D. RITCHIE

Plastic surfaced Douglas fir plywood, which has been produced on a limited basis by the fir plywood industry, is beginning to gain in significance. Better utilization of raw material, a more attractvie return for production dollars spent and the need for a special product in a competitive market have influenced this industry toward strongly considering this type of material in their long range planning.

THIS SUBJECT is not a new one and it may seem odd that we are still talking about the future of plastic surfaced Douglas fir plywood when the material actually has been manufactured since the early days of World War II. Many millions of feet have been made, but the real volume, according to the standards of the fir plywood manufacturer, is still in the future.

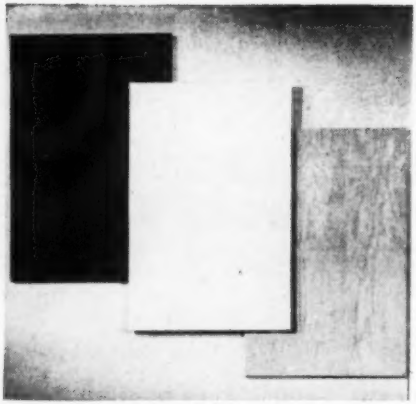
The fact that the production of plastic surfaced plywood has not expanded to a greater extent during recent years is due primarily to a steady demand for all of the standard Douglas fir plywood that could be manufactured. Under such conditions, special products, which require more attention and particularly more press capacity, develop rather slowly. Some material has been made right along, however. It has been a good breaking-in period, so that the time has not been lost.

Overlaid fir plywood as a new product has already been covered in previous papers and magazine articles. For this reason, this discusion will be devoted primarily to demonstrating how these products fit into the over-all industry picture. Conditions in the fir plywood industry change as they do in other industries; some gradually, some rapidly and unexpectedly. Therefore, if we examine these products in the light of present circumstances, perhaps we can keep our paper current and avoid repeating what has been said before.

To begin with, there are two requirements that any new product must meet if it is to have a future. First—there must be a demand for it. Second—it must be economical enough to produce so that it can be sold at an acceptable price and return a reasonable profit.

Sometimes the demand comes first; other times the product. In the case of plastic surfaced plywood, it has been established that it can be produced economically. Now we are beginning to give it the necessary push to build a market to receive it in volume and thus provide the two requirements for a sound future.

Mr. Ritchie is Allied Products Director, Douglas Fir Plywood Association. This speech was presented at the 1950 F.P.R.S. Convention.



Close up illustrates the three general types of plastic surfaced Douglas fir plywood produced currently.

Materials Currently Produced

Before discussing the overlaid fir plywoods currently produced it should be emphasized that at this stage in their development, no manufacturer is entirely set on the markets which he proposes to seek out, nor is he entirely certain that his present overlay is exactly that which he will wish to make in the final analysis. Therefore, while I am obliged to speak of types of overlay, I do not wish to leave the impression that they are in any way fixed or without possibility of adjustment.

There are three main types of plastic surfaced Douglas fir plywood produced now. Each has its individual characteristics, but they all have certain things in common. They are manufactured in standard plywood sizes and, with one exception, standard plywood thicknesses. They can all be manufactured on present equipment.

One type provides an opaque surface. It is a solid color, usually reddish brown, but a limited number of panels have been made in lighter shades. This material is intended to blank out the underlying veneer grain and present a uniform, smooth surface. It is a phenolic resin impregnated paper hot pressed to exterior type Douglas fir plywood. It is tough, durable, and an excellent paint base.

The second product is manufactured in a similar manner, but it provides a translucent surface that allows the underlying grain pattern to show through as a distinctive appearance characteristic. It is usually natural in color. It also may be painted, but since it has a very hard abrasion-resistant surface, it is most often used in locations where no finish is required.

Product number three is quite different from the other two. Rather than a resin-impregnated overlay, this material is made up of a phenolic resin and wood-fibre-mix hot pressed to one side only of an exterior panel. It is wood color and provides a good paint base. To date it is made only in the ⅜-inch thickness.

If you examine samples of these products, you will note that they are attractive in appearance, painted or unpainted, but that they are different from decorative laminates. The fir plywood industry is geared to large production. Their specialty items can be produced in large quantities on present fir plywood manufacturing equipment. They are not low-volume high-return items.

Overlays Improve Log Recovery

You may be acquainted with the tremendous expansion of the fir plywood industry during the past eleven years. Production has increased from six hundred fifty million square feet in 1938 to two billion square feet in 1948 and 1949. The number of manufacturing units has increased from 18 in 1938 to 54 at present. Hence, the demand for peeler logs has increased at a corresponding rate. Log procurement has generally become the number one problem. In order to protect their source of raw material, most operators

have acquired their own logging operations.

Not only has the demand for peeler logs increased tremendously, but the available supply is not of the clear, old-growth type used in the past. As a result, the plywood industry has had to do more patching, more plugging, more shimming, and more jointing of narrow strips than ever before. The industry has increased the percentage of 5-ply and "one-side" panels produced in order to spread the top quality face veneers as far as possible. The commercial standards are kept current so that they remain in line with the quality of veneer available.

Plastic surfaced plywood has a very definite place in this picture. It is an effective means of upgrading veneers into premium, finished products. This does not mean disguising low quality material. With opaque overlay surfaces, veneers can be repaired more rapidly and economically than would be possible if the veneers were exposed. Actually all veneer for plastic surfaced panels manufactured today must meet the standard for exterior type Douglas fir plywood, So far all overlaid panels exceed that standard.

Overlays a Factor in Plywood Production Costs

In addition to improving log recovery, plastic overlaid panels, as they are manufactured concurrently with fir plywood, can play an important part in meeting high production costs, particularly in regard to logs, labor, and overhead.

Log prices have risen steadily during the past ten years and, with a decreasing supply, it is concluded that they will remain high. In addition, there is the ever increasing expense of transportation. Logs must be moved farther from the forest to the plants.

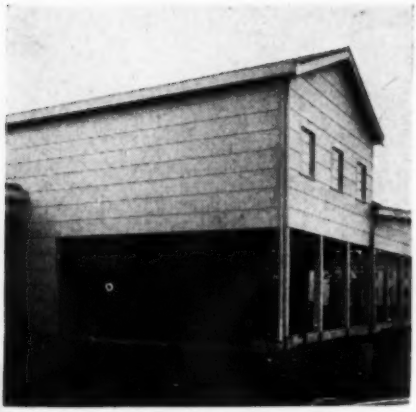
Hourly wages are at an all time high. These also must be considered permanent. In addition to hourly wages, there is increased cost due to the added manpower required to make plywood from the raw material available today.

Individual warm-room frozen food lockers are another outstanding use for plastic over-laid plywood. Very attractive in its unpainted form it provides a surface easy to clean and wear resistant.

Overhead has in the past few years taken all the usual jumps plus increases which go along with the extra manpower and machinery necessary under present circumstances.

In view of the foregoing, it has been said that the only out for the industry is to improve on equipment and to keep a constant vigil on efficiency of manufacture. This is correct as far as it goes, but there is another answer—that is, to produce some special product which employs generally these same raw materials, labor, and overhead, but which will bring in a higher dollar return per unit.

This is where overlays fit in. Certainly there are some added costs in connection with these specialty products. There is the cost of paper, the resin, and the longer pressing schedules which may mean reduced production. In addition, numerous small expenses are connected with the manufacture of a



Plastic overlay provides an excellent exterior for industrial buildings, as illustrated by the lapped siding treatment on this new dry kiln shed. It is equally effective on homes and commercial structures.

premium quality item. Yet, it has been proved (with these things considered) that such special products can be produced to advantage.

Thus it can be shown that the manufacture of plastic-surfaced Douglas fir plywood can be fitted into the production pattern of this industry with the result that a more economical use can be made of the logs, and, with comparable production costs, a high quality product can be manufactured which will bring a greater dollar return.

Overlays Complete the Marketing Program

Now, from the sales standpoint, I believe it can be shown that overlays can play a significant part in a well rounded marketing program. It already has been stated that a decision as to whether or not to manufacture such special products depends primarily on demand — actual or potential. It depends likewise on what the demand is for the bread and butter item, Douglas fir plywood; and on what the competitive situation may be in regard to Douglas fir plywood. To illustrate — may I remind you that the fir plywood industry, with all its increased capacity, operated at full tilt for 10 years up through most of 1948. The shortage of plywood was acute; order files were full without exception, and volume production was the prime consideration. Under such conditions, specialties necessarily took a back seat.

Came the turn — and we found ourselves like many other industries in a strenuous competitive situation. We are over the first shock and today the volume of business is excellent, but the industry is now keenly aware of the need for a vigorous and continuing sales program. A long range viewpoint is being taken regardless of the fact that the need for developing immediate outlets is not present.

These are the circumstances best suited for such new developments as the plastic surfaced panels. First — because top efficiency in production replaces top volume as the number one goal. There is a place, therefore, in the manufacturing schedule for specialties. Second — because it is advantageous in a highly competitive market to have a "lead item"; a specialty which is not manufactured by everyone else. It will bring a greater dollar return. It can be an entering wedge and many times will carry the primary product along with it. Third — since it is a premium specialty and not manufactured by all of the producers of regular Douglas fir plywood, it may have a stabilizing influence on the market generally. It need not be subjected to the sometimes erratic ups and downs of plywood and lumber.

Since demand is the number one consideration in the last analysis, let us examine for a moment what demands exist at present and what potential demands may be expected in the future.

FAST... LOW COST EDGE-GLUING

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- Truly flat panels with sound joints
- More sq. ft. per man-hour
- Lower glue cost
- Lower cost per sq. ft.

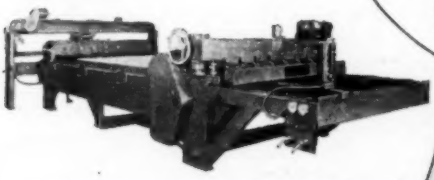
THE ONE-MAN ELECTROGLUER

With this high-frequency edge-gluer, one man can turn out 3000 to 6000 sq. ft. of panels or core stock per day. Equipped with Westinghouse 5 K.W. High Frequency Generator and finger-tip control.

THE ELECTROGLUER

Ideal for the plant requiring 5000 to 10,000 sq. ft. per day. Equipped with conveyorized glue spreader and Westinghouse 10 K.W. High Frequency Generator. Five sizes, 32" x 78" to 50" x 100".

PLYCOR HYDRAULIC LUMBER PRESS



For maximum production at lowest cost. Produces a continuous ribbon of glued-up stock automatically cut to width without interrupting operation. Steam heated platens insure fast, even cure with imperceptible glue lines. Two sizes, 86" and 102", handle stock from ½" to 2" thick.

■ Whatever your requirements may be, Plycor can supply the proper equipment for fast, efficient production of highest quality glued-up panels and lumber cores at lowest cost.

Plycor equipment is in daily use in hundreds of the country's leading furniture and woodworking plants manufacturing the finest quality furniture, radio and TV cabinets, pianos, doors, etc. And . . . in every instance these machines have established an enviable record for complete satisfaction, high production and economical operation.

You'll find it time well spent to discuss your plans with a Plycor engineer. He will gladly make a study of your requirements and submit recommendations without obligation. Meanwhile, write for descriptive literature.

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For cabinet work and similar interior applications the smooth, grain-free plastic surfaces provide the ideal base for high gloss finishing.

In times like these, one might easily be led astray by apparent enthusiasm for new products which, over the long pull, might not continue. When the regularly produced material is difficult to obtain, a certain amount of demand for specialties builds up because they may be more readily available. Thus a false situation is created because the premium products may be put to uses which normally would not make sense. If our mills were willing to promise today that overlaid panels could be delivered promptly, I have no doubt that they could stimulate a tremendous interest in the material on that basis alone. This approach has been rejected. Actually, production of plastic surfaced panels is limited substantially so that the bread and butter item can be produced in volume.

There is a very real demand for these products at present which I am convinced is based on the qualities that the materials offer and the promotion and advertising which has been put behind them so far. It is not a result of a temporary plywood shortage.

Concrete Forms Expanding Market

Concrete form work is perhaps the greatest single outlet. Overlays do a superior job in providing a smooth, "fin-free" concrete surface. They can be reused many times so that they are economical. They strip easily, clean readily, and will stand a great deal of abuse. Where a smooth architectural type of concrete is required and it is possible to reuse the panels again and again, they are ideally suited.

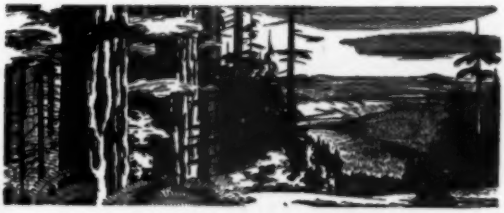
Perhaps the best illustrations of this type of use are some of the huge apartment house jobs throughout the country. Outstanding among these is the giant Parklabrea project in Los Angeles. Here eighteen apartment house buildings each thirteen stories high plus one-story garages are of concrete construction. Concrete forms required 3,000,000 sq. ft. of Douglas fir plywood of which 750,000 were plastic surfaced. All the exterior of the building and interior ceilings were formed against plastic to supply the smoothest surface possible. The ceilings will be painted as is, with a minimum of further preparation. The Parkway Apartments, located just outside of Newark, New Jersey, is another example. The well known Gowanus, Woodside, Jacob Riis, and Waldon Terrace projects are excellent demonstrations in and around New York City. This is a big market and indications are that it will continue to increase.

Other Uses

There are numerous other applications such as box cars, refrigerator cars, truck bodies, trailers, walk-in refrigerators, cabinets, table tops, marine uses, toys, cut-outs, exterior siding, store fixtures, — even flooring. These are demonstrated uses, but they have not yet been developed to any significant extent. They represent tremendous potential markets.

Consider siding material for example.

fine Oregon Douglas fir



plus

fine plywood mills

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fine people

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The Douglas fir that grows in Oregon's rain belt is the finest on the face of the earth. That's why we use it.

The mills in which we make our plywood are models of efficiency in the industry.

The people who work with us are skilled, interested, productive, with pride in their jobs.

From these ingredients of materials, machines and men comes APMI plywood; exterior and interior panels that carry double marks of quality—the DFPA grademark and our own trademark.

Your inquiries are welcomed at our general offices, or at APMI sales warehouses.

Plastic faced plywood interior paneling. Permanently fused to exterior fir plywood, the new plastic overlay gives ultimate in smooth, grainless, highly paintable surfaces.

No real emphasis has been placed on the use of overlays for this purpose, yet it can be advocated for a lot of very good reasons. Like plywood, large panels have the advantage in that they can be applied swiftly with consequent reduction in labor costs. Such panels would provide a uniform, smooth surface which will withstand permanent exterior exposure and on which a good quality paint will hold up for a long time.

Lapped siding is very popular and probably always will be in some form. It is possible to cut these panels into attractive widths for this type of application, and there is an added advantage here because wider boards may be obtained than are generally available in lumber siding. The lengths are such that there is a minimum of waste involved. One manufacturer is willing to rip panels into 8-, 16-, or 24-inch widths, and package and deliver them at a price that is competitive with other siding materials. That is the direction in which we are heading. If any kind of a market at all can be built up for siding, gable ends, and similar exterior uses, these outlets alone might well tax industry production.

Actually most of these products could be applied anywhere that plywood is employed because they have the inherent characteristics of plywood. They do have premium quality faces, however, so that uses are limited to location where this is of definite value. Plastic surfaced panels are not in competition with regular panels. They can be promoted for uses where their special properties are particularly valuable and thus contribute to expanding the markets of the plywood industry generally.

Plywood Association Program for Plastic Overlays

We are confident that there will be new special products in the future and that the volume of those now produced will increase. On this premise, the management committee of the Douglas Fir Plywood Association established the Allied Products Department. Perhaps a summary of the program set up for this division will serve to round out the discussion.

By way of preliminary explanation, the Douglas Fir Plywood Association is a trade promotion organization made up of 50 mills. These plants are located on the Pacific Coast between Calpella, California, which is almost down to the San Francisco area, and Bellingham, Washington near the Canadian border. It is a voluntary organization of these manufacturers for promotion, research, and quality control of Douglas fir plywood. The Association is made up of a number of departments: Publicity, Field Service, Technical, Traffic, Statistical and Allied Products.

The relatively new Allied Products Department was set up for the purpose of working the plastic surfaced plywood and other special materials into the comprehensive industry program. Thus, Association experience and facilities are

for production-line efficiency...

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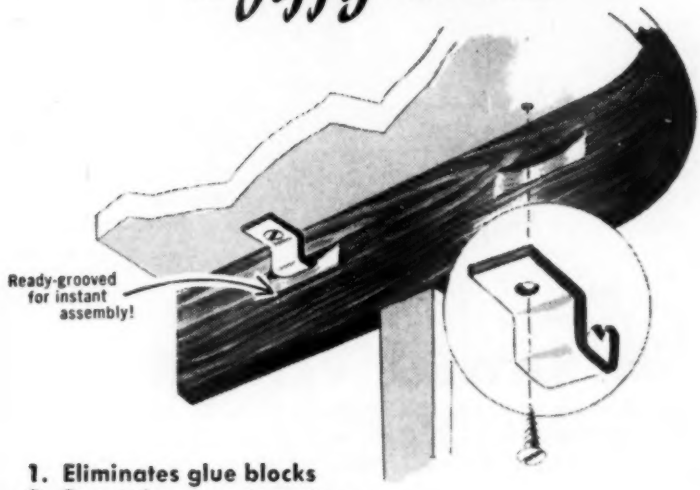
WITH OUR EXCLUSIVE NEW FEATURE:

THE *Jiffy-set* BRACKET



1. **Eliminates glue blocks**
2. **Saves time... cuts costs**
3. **Allows easy, speedy assembly!**
4. **Furnished free with order**

Molded plywood table aprons and chair rims... cut to length, according to your specifications; faces selected for color... sanded... shipped ready for finishing. Write for our catalog.

NO MINIMUM QUANTITIES REQUIRED ON STOCK MOLDS!

LAMINATED VENEERS, INC.

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now being put to work for these new materials.

Considerable progress has been made to date. A lot of preliminary testing has been carried on in the Association Laboratory to build up information. We now have a standard set of uniform test methods for evaluating the properties of the overlays. These are tentative, but they are in workable form and are being employed. A quality control procedure including routine inspection and glue line testing has been established and is in force at the present time.

From the promotion standpoint, a uniform trade-mark for certification of quality will be branded on all products coming within the scope of the program and will be used in advertising and promotional literature. Industry wide advertising of overlays through the Association is in a formative stage, but the first material should be out before long. This will be educational in form and quite general.

Technical data pertaining to each product wil be distributed by the manufacturer.

All manufacturers of plastic surfaced plywood indicate that their individual advertising campaigns will increase and we have devoted a considerable amount of time in the Allied Products Department to working with the manufacturers on the promotion of their own products.

The foregoing information is offered, not to publicize the Douglas Fir Plywood Association, but to show you that the plywood manufacturers have a real interest in plastic surfaced plywood and that they are willing to put time and money into its development. We are convinced, first — that overlays can perform a very significant function in better integrating production and in

Prompt Mill Shipments

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For manufacturers of Flush Doors, Special Millwork and Office Furniture, AETNA offers prompt mill shipments on Sawed Veneer Face Stock in thicknesses from 1/20″ to 1/4″ in these species:

Plain White OAK	Rift Red OAK
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Direct mill shipments on:
Quarter Sliced PHILIPPINE MAHOGANY VENEER in 1/20″, 1/16″, 1/12″, 1/10″ or 1/8″.

Write today—sending your complete specifications. Aetna will quote you prices and delivery schedules.

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NEW! Marcoloy Carbide Saw

Cuts veneered panels without fuzzing, tearing, or splintering!

This saw was engineered to cut veneered stock across the grain on a tenoner—without tearing. The teeth are of long-lasting Marcoloy carbide and are adjustable.

The saw makes a scoring or edging cut through the veneer—no fuzzing, tearing, or splintering. The panel is then finished with cope knives flush with the edge of the veneer made by the scoring saw.

The scoring teeth are designed and positioned to make a slicing cut across the veneer rather than a sawing action. This eliminates all tearing or fuzzing.

The carbide teeth will withstand severe wear in spite of the abrasive glue line.

Because of its solid construction, this Marcoloy Carbide Saw cannot lead in or out. This new method produces a clean, smooth edge on the panel that is ready for finishing with a minimum of sawing.

If you have to cut plywood or veneered panels, let us help you solve your problem. Send us a sample of your work with the necessary machine information. You may have our recommendations for the asking — without cost or obligation. Just write!

MARCOLOY CARBIDES

GET IN TOUCH WITH MARCOLOY, INC., SPRINGDALE, CONN.

contributing to a well rounded marketing program; second — that with keen competition anticipated for the future, there will be a sharp up-swing in the development of new specialties and in the volume of production of such items now being made.

The End

COMBINATION GRINDERS

Bulletin C-10 describes the combination knife and side head grinders manufactured by the Dependable Machine Company, Greensboro, North Carolina. The side head grinder unit is equipped with the new head setting gauge G-11 which is claimed to be a great time and money saver as it reduces grinding time and adds to the life of the knives by preventing excessive grinding. Other features are described and complete specifications are given.

Write the above company, Dept. WD.

PACKAGE PLAN FOR TRADE SHOWS

Management of the Grand Central Palace informs us that they have set up a "package plan" for handling trade shows. A brochure about the plan is available from the hotel, New York City.

This new package plan includes 153 booths, two meeting rooms with a seating capacity of 1600, registration area, manager's office, press rooms, public address systems, storage space, exclusive elevator service and a special rate for summer months.

W. A. ROBBINS

W. A. Robbins, a midwestern representative for the Mattison-Greenlee Service Corporation, died suddenly on January 28, at Goshen, Indiana.

Mr. Robbins had been with the Company for more than 30 years. His practical knowledge of the business and well known integrity helped him to make many friends both in and out of the woodworking trade.

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* **The Huntington Chair Corp.** of Huntington, West Va., report the following:

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"This machine has been a valuable addition to our plant since it was formerly necessary that we buy commercial plywood and we were unable to secure consistently the quality necessary for our production, consequently we have **increased the quality of our product** and have found **A SAVINGS IN THE COST OF PRODUCING OUR OWN PLYWOOD."**

THE ABOVE ARE OPERATION FACTS AND CLEARLY SHOW YOU CAN DEPEND ON

"VB" PRESSES
for Proven Performance

THE "VB" PRESS
Constructed by Craftsmen and engineers to do an A-1 job in a minimum of space. It is available in sizes from 36x52" to 50x100" or to your specification.

WRITE TODAY—get sizes and prices. Also free booklet "Modern Gluing in the Wood Industry."

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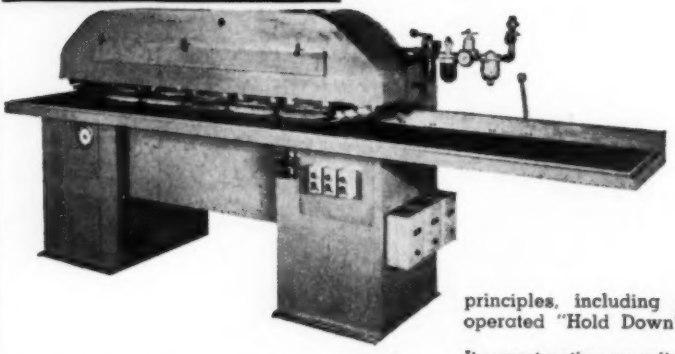

Our New Continuous Feed Veneer Jointer we believe is far superior to any continuous Feed Veneer Jointer heretofore made.

It has several revolutionary mechanical principles, including pneumatically operated "Hold Down" Shoes.

Its construction permits perfect work on extremely long stock, and it will joint successfully highly figured veneers such as burls, crotches, etc. The machine is equipped with a glue spreading attachment.

THE VENEER MACHINERY CO.

MAKERS OF THE DENNIS TAPING MACHINE

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Veneer and PLYWOOD

By Ned Bailey

Part VII

EVERY STEP in the manufacture of veneer and plywood is important in itself, however, there are a few places in the preparation of veneer that stand out as very important. Among these are jointing, splicing and repairing. This is true because it is impossible to make good joints which will remain close unless the veneer to be joined together has been cut with perfectly straight edges free from all traces of splintering. This cutting is done on the veneer jointer, which I believe, to be among the most important machines used in manufacturing veneer and plywood.

Unless veneers are dried to a very low moisture content and used immediately, it is customary to redry them when they are removed from storage prior to the gluing operation. Most of this veneer is somewhat wrinkled, and at about 10% moisture content or more. This means that it must be redried and flattened before it can be used. The redrying is usually accomplished by means of platen driers, consisting of a series of smooth, flat, steam-heated platens which alternately close and open to allow the moisture to escape from the surface of the wood. In recent years, progressive platen driers described in my article in the February issue of WOOD WORKING DIGEST have been successfully used for redrying.

Veneers are usually redried to 5% of moisture content, or even less, if liquid glues are to be used. In the case of fragile veneers, such as burls and crotch, the moisture content is rarely reduced below 10%. When sheet glue is used, the moisture content of the veneer should range from 10 to 12% in order to insure an adequate flow of the resin during the bonding cycle.

Drying and smoothing fancy face veneers requires much more patience, care and ability, than just drying face veneers. Here a real craftsman must be employed, one who has the ability to see beforehand that a beautiful veneer face can be made from a flitch of figured veneer still in its original irregular shape.

The drying is done in many respects the same as it is with plain veneer. The exception is in the case of highly figured and wrinkled veneer. In as

much as the platen drier is quite often too severe to use on these fragile face veneers, three or four thicknesses are placed between large heated boards about 3 x 8 feet in area. The boards are heated in a plate drier and the sheets of veneer dampened by sprinkling. Then alternate layers of hot boards and damp veneer are piled up to about 3 feet high. This pile is gradually weighted, clamped or screwed down, little by little. The combined weight, heat and moisture softens the fragile veneer, making it more pliable. In some instances, this treatment must be repeated before the desired results are obtained.

The dried, plain veneer, when in fractional sizes, must have the edges clipped absolutely straight, readying it for taping to the size that will allow for final trimming when it is made into plywood. For core or back layer of plywood, the veneer is usually clipped on a scissor-type machine. With plain-face veneer, it is necessary to joint the edges. A multi-knife rotary head jointer is used to plane the edges of plain veneer. During this operation the veneer is usually clamped together in packages of from 2 to 4 inches thick. The same method of packaging is often used to clip the edges of plain veneer with a guillotine type cutter.

In the case of particularly fragile veneer, they can be toughened by dipping them in any one of several toughening solutions on the market. They then can be redried to 5% moisture content. The toughening is done to the untrimmed veneer before dimensioning. The veneer, after immersion, is placed on end on a drainboard to drip dry before being redried down to the desired moisture content.

The more highly figured flitches are usually rough cut to size with particular attention being paid to centering or balancing the figure effects. These dimensioned face veneers are again trimmed in packages to true square edges with the right angles on the guillotine cutter, after specifications and desired results have been taken into consideration.

Some manufacturers go one step further before taping. When working on veneers to be used for faces and for all veneer to be spliced on the tapeless splicer, after the batch has passed the cutterhead, the freshly cut edges are coated with a film of glue before the clamping bar is released. This makes it easier, later on, to joint the veneers without the use of tape.

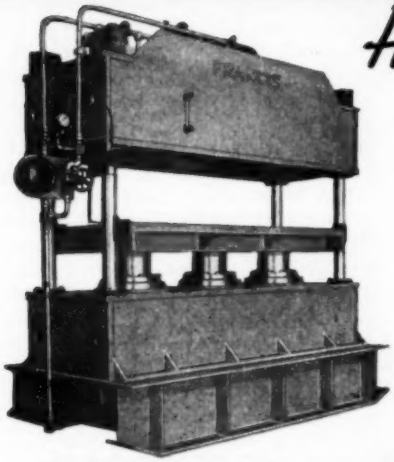
Splicing is the next operation in the production line. In this country there are two types of splices in general use, the tape and the tapeless. The tape type as the name implies, employs gummed paper tape to fasten two pieces of veneer together edge to edge. The gummed tape, on a spool above the point where it is to be applied, passes through a device which moistens the gummed side, the tape then passes down under rollers onto the veneer. The shafts of the rollers are so angled that they draw and hold the edges of the veneer close together. The rollers are electrically heated so that they dry the tape while it is still under their pressure.

The tape used on veneer sheets for inside plys is usually perforated for better plywood adhesion. The tape for face and back ply does not need to be perforated as it is ultimately sanded off.

The tapeless splicer which is becoming popular throughout the country glues the veneer edge to edge, eliminating the use of the gumed tape. Just so nobody will doubt the strength of such jointing, during the last war, military experiments demonstrated that tapeless splicer joints, properly made, are as strong and durable as the veneer itself.

Francis
EST. 1880.

DEPENDABLE GLUE ROOM EQUIPMENT



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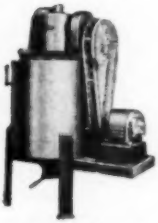
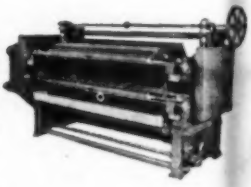


GLUE MIXERS—Mixers for every purpose and all types of glues . . . double agitation plus sweep paddle to prevent settling of glue fillers. Available in sizes up to 200 gallons, with or without stands. Can be used for mixing paint, rubber cement, etc.



GLUE SPREADERS—Pay for your glue through savings with Francis Double Roll Glue Spreaders designed for proper application. Single top and bottom coating machines, laboratory and experimental models. Simple and accurate adjustments . . . easily and quickly cleaned . . . in sizes from 12" to 108" in length.

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EXCLUSIVE REPRESENTATIVE PLYCOR COMPANY
DIVISION OF EARLE HART WOODWORKING MACHINE COMPANY
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These joints were approved as the equivalent of solid veneer, under the most exacting tests, in both air craft and marine plywood.

The tapeless splicer in addition to saving the tape as just mentioned reduces the final sanding, after the plywood is completed. There are two types of tapeless splicers, both are somewhat similar to the standard taping machine. In one tapeless splicer, the veneer sheets have glue applied to both edges while under pressure in the jointer. This is done by means of an added glue roller. In the other types of tapeless splicers, the adhesive is applied just ahead of the heating rollers. In both types, the glue is partly dried and pre-moistened with a solvent when necessary.

The removal of unsound knots and replacement with plugs of sound veneer has been done in this country and abroad for a number of years. For a long time it was done by hand, one operation after another. Dies of various sizes were on hand to cut out different sized knots, or it was done with a small router saw, the cut being made on a bevel. The plugs, similarly cut, were glued and taped or pressed into place, and a very close fit obtained. Machines are now available, which not only cut out the defects, but also insert the patches all in one operation. On the west coast, the plugs are cut in the shape of a canoe with pointed ends. This tends to make the patch less conspicuous than a round or oval one. The longitudinal hard and soft grain being given a better opportunity of blending into the surrounding veneer, because of its shape. All plugged boards should be sanded, not scraped. In this manner, a perfectly flat surface results. Plugged boards do not stain well, as the plugs are liable to show up in a very conspicuous manner.

The End.

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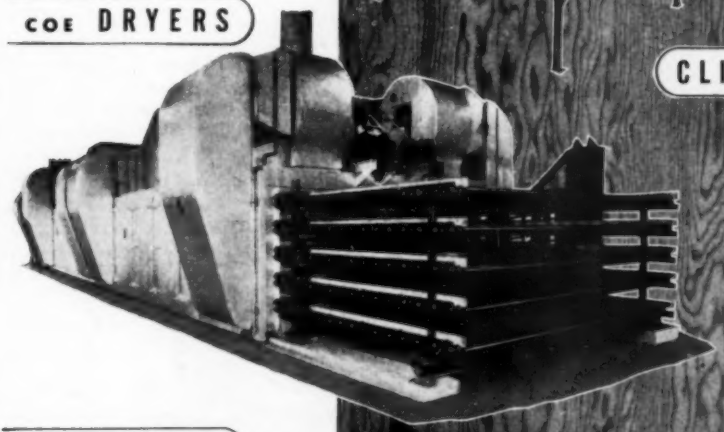
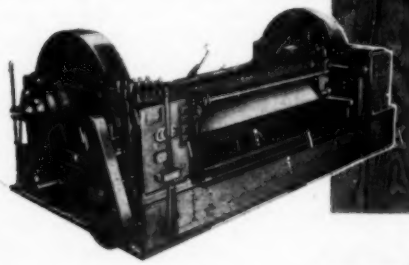


COE LATHES



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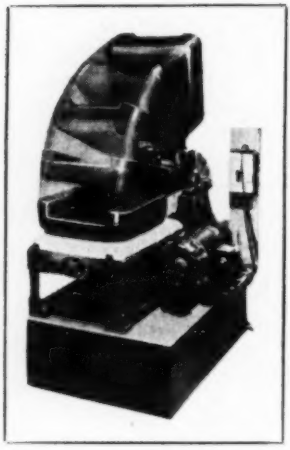

Texlite rubberized curled hair vulcanizes styling and comfort in position

builds lasting cushion comfort

This Rway sitting machine threw a 220 pound weight against a Texlite* seat cushion. After 100,000 cycles, equal to 15 to 20 years of actual wear, Rway said: "Texlite never failed to resume its normal resiliency."

As a result of their test, Rway Furniture now uses Texlite exclusively in all their bedroom and dining room chairs.

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*Neoprene wool Texlite 5 lb. density per cu. ft.

THE SPONGE RUBBER PRODUCTS COMPANY 445 Derby Place, Shelton Conn.

Manufacturing

PROCESSES AT THE IPIK PLYWOOD COMPANY

PRIOR TO the development of boil-resistant, non-staining synthetic resin adhesives, plywood sheets with comparatively thick face veneers usually were specified for exterior application. The face veneer protected vulnerable glue lines and helped prevent delamination. However, after continuous exposure to the elements, these heavy face veneers had a tendency to check and warp, thus affecting the product's appearance and serviceability. In addition, heavy veneers proved more costly than light ones and, as they were not so readily available, their use presented production problems to the woodworker.

The Ipik Plywood Company, Kenner, Louisiana, along with numerous others, have discovered that modern adhesives overcome many of the gluing problems of yesterday. This firm is using Melurac 300 in assembling cores, crossbandings and face veneers for the hot press bonding of its solid-core flush doors. These doors are produced in a variety of sizes and wood veneers, for exterior and interior use.

The Ipik Company tested a number of glues before deciding that Melurac 300 would be easy to mix, permit a longer assembly time, lower temperatures and pressures required during pressing, help eliminate "bleed throughs" and contribute waterproof bonds.

All lumber used for core material in Ipik doors is well seasoned, air dried hardwood. Upon arrival at the plant it is checked for grade and moisture content, properly stacked and placed in a Moore cross-circulating dry kiln. As soon as the desired moisture content is obtained, the wood is removed from the kiln and stacked in drying sheds where it is allowed to cool.

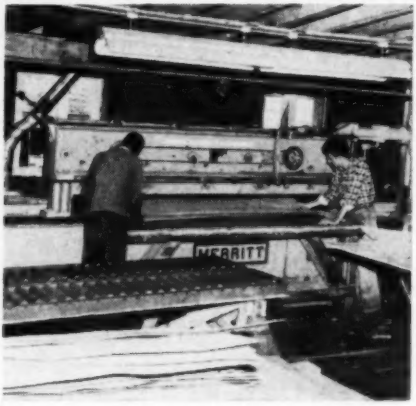
Following this step, the lumber is dressed with a Whitney double surfacer and fed by conveyors to a series of cut-off saws. At the cut-off saws all defects are removed and the material is trimmed to proper dimensions. Then it is glued together in a cold press, clamped under pressure with Black Brothers cold-pressing equipment, processed through a dryer, and allowed to set. By means of a six-foot band mill the material is cut into slabs of the proper thickness for cores and again dressed in a 36" Oliver Straitoplane. This process not only assures well dried, quality core material, but also develops all quarter-cut staves in random lengths and uniform widths. After planing, the core mill operation is concluded by trimming to door sizes with a Diehl rip saw.

The crossbanding on all Ipik doors

Early stage of manufacture as lumber is processed by Whitney double surfacer.

consists of hardwood obtained from local veneer mills. This material is constantly checked for moisture content and for uniform thickness and grade.

Face veneers are selected by Ipik's buyer from samples submitted by various veneer manufacturers who specialize in cutting fine material. After receipt and inspection of the shipment, this material is processed through



Merritt veneer jointer. Edges are coated with American Cyanamid's Melurac 300.

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A BLOND FIGURED WOOD FOR DECORATIVE PURPOSES.

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and the earth and the forests shall be replenished

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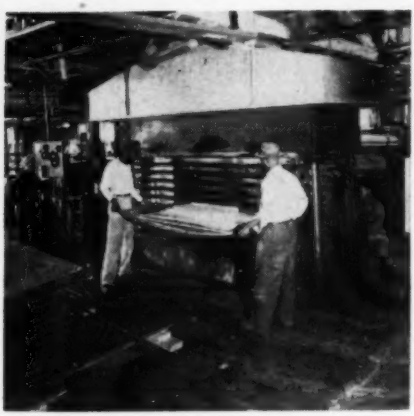
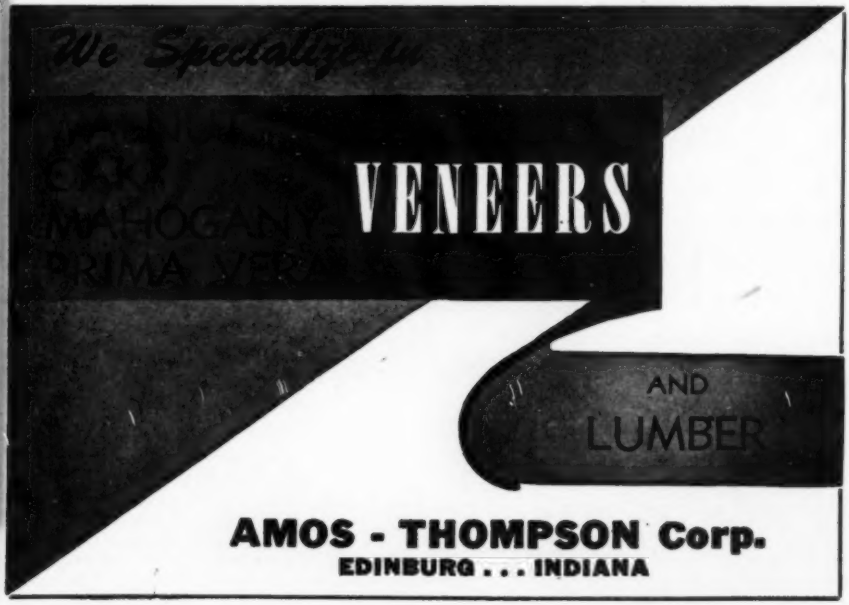
Assemblying veneer into door-face sizes at the Diehl tapeless splicer.

the veneer department. All defects are removed by Capital drop clippers; veneers are graded and selected for color and grain to ensure well-matched, defect-free faces. The veneers then are conveyed to the Merritt veneer jointer, where edges are coated with Cyanamid's tapeless splicing adhesive Melurac 255.

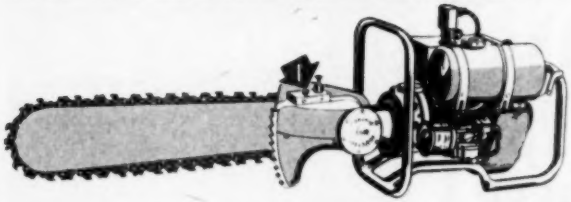
They then go to another series of Capital clippers for matching and sizing, from which they proceed to a battery of Diehl tapeless splicers. Here they are assembled into the proper sizes for



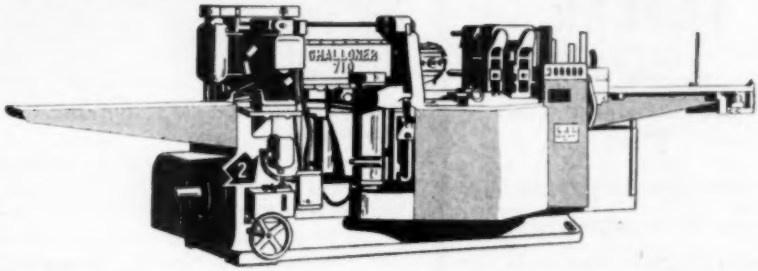
Doors are bonded in the 10-opening Francis hot plate press.



from a small Lombard chain saw



to a large CKL door sticker



Bijur lubricating systems insure correct lubrication

To keep the chain saw well-oiled, Lombard builds in a miniature "one-shot" lubricator (1). Similarly, CKL designs a Bijur fog system (2) into the door sticker to keep the spindles running smoothly at 9000 rpm. Both manufacturers have solved their lubrication problems with Bijur lubricating systems—custom-engineered for all types of wood-working machinery. Write for descriptive bulletins.

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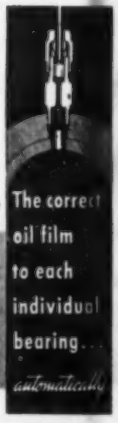

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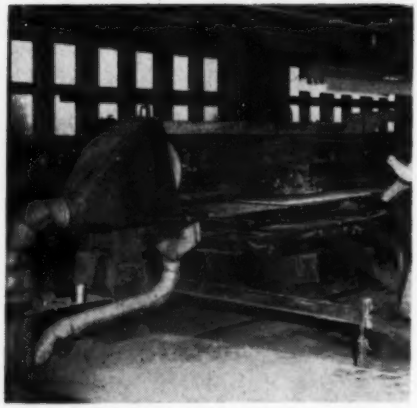

Finish sanding on the Mattison automatic stroke sander.

door faces. Prior to hot-press bonding the faces are inspected again to make certain that there are no defects in material or workmanship. All Ipik doors are bonded in a Francis, 10-opening hydraulic hot plate press. They are pressed at 260°F. under pressure of 175 pounds per square inch. After pressing, the doors are hot stacked for a minimum period of 48 hours to allow uniform cooling and moisture equalization. The doors then are trimmed to size with Mereen-Johnson double end cut-off saws.

All doors then are inspected once again and a sealer is applied to top and bottom edges. Following this, the doors are sanded. A Mattison automatic stroke sander and a Wysong & Miles hydro-stroke belt sander are employed for this operation.

In order to provide a door that meets architectural specifications and yet avoid additional handling between the factory and the job, Ipik has installed a millwork department which is equipped to handle such special work as glass or louvre openings and Dutch doors. All moldings in this department are manufactured by a Smithway molder.

Shipments are made in carload or truck lots, as well as LCL by rail and motor freight. All possible precautions are taken to ensure safe delivery.

Ipik engages in its own research as well as taking advantage of general developments in the industry in order to keep their products at high quality level.

The End

KNIFE BULLETINS

Knives for every purpose are illustrated in the bulletins issued by the Taylor-Stiles and Company, Riegelsville, New Jersey. Explanation of the physical characteristics of knives and the hardness required for each type of work, information concerning the ordering of knives and other pertinent data are included.

Write Dept. WD of the above company.

LONG PLYWOOD PANELS

By scarf-jointing standard size sheets of plywood with new precision scarfing and taping machines, the Anacortes Veneer, Inc. is making these sheets.

New uses for these one-piece long panels are in boats, modern building fronts, boxes, truck walls and floors and circular grain silos. Other information and uses are found in the bulletin.

Write the Aetna Plywood and Veneer Co., Dept. WD, 1737 N. Elston Ave., Chicago, Ill., the midwestern distributor, for a copy of "Long Panels of Armorbond Douglas Fir Plywood."

A new father was looking over the babies through the plate glass window in the infant ward. Every baby there, it seems, was crying.

"What's the matter in there?" he asked the nurse.

"If you were only a few days old, out of a job and owed the government $2,500 you'd be bawling too," replied the nurse.

Veneer Newsletter

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From a stick to a carload, you'll find DEACON tuned to your needs and ready to serve you promptly and well.

Phone, wire or write today for stock list and prices on your requirements.

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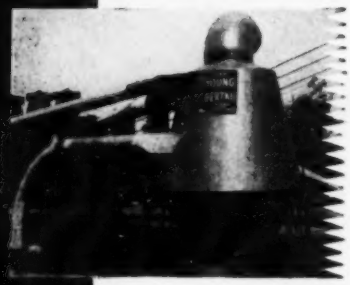

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Young and Bertke engineers design and install dust collecting systems that are the last word in efficiency and renovate obsolete or inadequate existing systems so that they do an efficient job for you.

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NEW SHUTTLE BONDING TECHNIQUE

Weaving shuttles, traditionally made of dogwood or persimmon wood for high impact strength and retention of smooth contours for long periods of continuous operation, can have longer life by surfacing the shuttle on two or more sides with hard fiber sheet.

Electronic dielectric heating techniques have been adapted to shuttle bonding to improve the quality of the bond, reduce its cost, and increase production. Use of a radio-frequency generator for heating, plus an automatic hydraulic press, which gives uniform pressure on both the straight and curved portions of the shuttle face, produce a uniform bond the length of the shuttle.

The new technique uses "stray field heating," with electrodes embedded in rubber on the surface of thick rubber

dies, to heat the glue line for the purpose of polymerizing the thermosetting plastic glue used with the new process. A radio-frequency generator supplies the required dielectric heat at a frequency of approximately 13.6 megacycles per second. A standard steel die set, used in a hydraulic arbor press, makes up the upper and lower platens on which are mounted the electrodes and rubber dies.

The final design incorporates solid rod type electrodes running transverse to the shuttle. These rods are heavy enough not to bend over the edge of the shuttle when pressure is applied, yet flexible enough to conform to the contours of tapered shuttles. The complete setup allows one set of electrodes and one press to bond all the hundreds of different sizes and shapes of shuttles manufactured. Total curing time is 90 seconds.

Complete information about the process and the radio-frequency method, including description of the generators, is available from Dept. WD, Westinghouse Electric Corp., 306 - 4th Ave., Pittsburgh, Pa.

Give me the benefit of your convictions, if you have any, but keep your doubts to yourself, for I have enough of my own.—**Goethe**

CLICK'S VENEER TABLES

For Manufacturers, Dealers — Anyone Who Works With VENEER, PLYWOOD, CUT LUMBER, BOXES, ETC. • • •

A handy book of accurate tables for quickly determining square feet contents of veneer and the cubic contents of logs, complete to fractional units.

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ROUTER YOU CAN USE *for*. . .

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. . . furniture, built-ins

. . . decorative pieces

. . . sash and door fitting

. . . pattern making

. . . general millwork

PORTER CABLE Speedmatic ROUTER

HANDIEST because it's PORTABLE. Carry it anywhere in the shop — use it when stationary tools are tied up on other work . . . on short-run jobs . . . for freehand routing and shaping in pattern making. Take it to building sites or houses for interior trim . . . it's as portable as your lunch box!

HANDIEST because it's VERSATILE. Makes *any* cut you want — 140 bits and cutters available . . . also stair, hinge butt and lock face templates.

HANDIEST because it's ADAPTABLE. Motor is *interchangeable* with 3 other precision woodworking tools you'll want later on: Speedmatic Plane, Lock Mortiser and Bench Shaper. By eliminating the cost of 3 additional motors, you save $270 on the entire group!

Model UB (Illus.) **1 H. P.—$135.**

Model UC 2 H. P.—$210.

Examine this handy Router at your Speedmatic Distributor's . . . or write for more information.

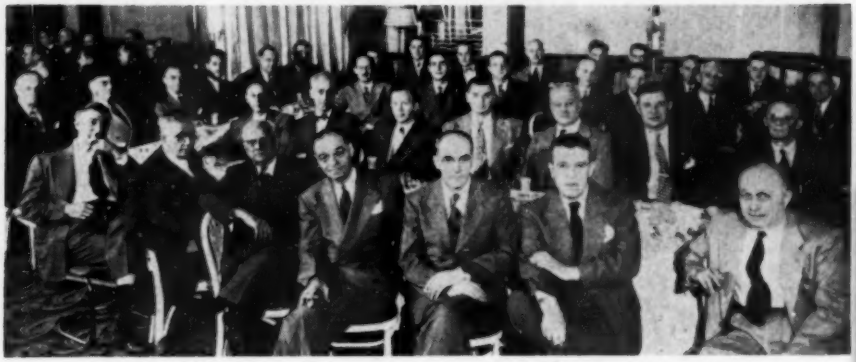
Featuring: Micrometer Depth Adjustment • Interchangeable Self-Ventilating Motor • Oversize Oil-Sealed Bearings • Hardened and Ground Steel Alloy Chuck

PORTER-CABLE Machine Co. 5023 N. Salina St., Syracuse 8, N.Y.

Manufacturers of SPEEDMATIC and GUILD Electric Tools

In Canada write: Strongridge, Ltd., St. Catharines, Ont.

WOOD Industry Notes



COMPANY BEGINS 75th YEAR

The Maas & Waldstein Company held a luncheon in connection with their January National Sales Meeting. Dr. G. Klinkenstein, president of the Company, spoke before the group and said that 1951 should be a very busy year for the finishing field during the transition from civilian to defense business. The accompanying illustration shows the group at Essex House, Newark, N. J.

WESTINGHOUSE ELECTS

The board of directors of the Westinghouse Electric Corporation has elected four new vice presidents. They are: Tomlinson Fort, manager of the Company's headquarters apparatus sales department at Pittsburgh; L. W. McLeod, southwestern district manager; Emery W. Loomis, middle Atlantic district manager; and L. E. Lynde who will head the Company's Washington, D. C. government office.

KILN DRYING SHORT COURSE

A short course in kiln drying lumber will be given at the North Carolina State College Wood Products Laboratory, March 19-24. The course is designed for kiln operators and supervisors and men interested in moisture content control in manufacturing. Topics to be covered include air seasoning, kiln construction and modification, reduction of defects due to drying, revised kiln schedules and kiln operation for speed and quality.

Application blanks and additional information from School of Forestry, N. C. State College, Raleigh, N. C.

PACKAGING EXPOSITION

The 20th National Packaging Exposition is to be held in the Auditorium at Atlantic City, N. J., April 17-20. Among others, the Paisley Company of Chicago will be exhibiting and plans to feature their consultation service.

STALTER

THERMO TEMPER

TUNGSTEN TEMPER

KNIVES

do the job better

Your machines are only as efficient as their knives. Stalter knives will improve their work and production. They stand up under high speeds and heavy feeds. Thermo-Temper knives represent the finest in carbon steel; Tungsten-Temper gives you the advantages of high-speed steel. For over 35 years we've supplied woodworkers with knives for shapers, planers, tenoners, moulders, etc. Also automatic lathe knives and band saws.

PROMPT DELIVERY

Let us recommend knives for your machines and jobs. Ask for catalog containing com plete details. You are promised prompt de livery of all orders.

STALTER EDGE TOOL COMPANY

GRAND RAPIDS MICHIGAN

Appointments

C. H. Wills has moved from general sales manager to director of sales for the Michigan Abrasive Company, Detroit. **B. S. ("Barney") Meade** has joined the firm in the capacity of general sales manager.

C. H. Wills

B. S. Meade

Resinous Products Division of Rohm & Haas Co. has appointed **Carl B. Bennett** to its field staff in the Ohio area.

The Marsh & Truman Lumber Co., Chicago, announced the following officers for their organization: **G. L. Fairbairn**, vice president; **R. M. Broaddus**, secretary; **A. Fletcher Marsh**, president and **W. M. Burns**, treasurer.

The National Wooden Box Association elected **H. H. Pein**, Pein Box Co., Oregon, Ltd., Portland, Oregon, president at their January meeting. Reelected during the session were vice president **D. A. McNeill, Jr.**, McNeill, Lauff and McNeill, Thomson, Georgia; execu-

H. H. Pein

tive vice president **C. D. Hudson**, Washington, D. C.; and treasurer **P. John Galbraith**, John Galbraith, Philadelphia, Pennsylvania. Newly elected vice presidents were **Morris Milbank**, Rouge River Lumber Company, Grants Pass, Oregon and **Robert F. Miles**, Rathborne, Hair and Ridgway Company, Chicago.

Following the annual meeting of the board of directors, **A. H. Rosenbloom** was elected vice president of the Joseph Behr and Sons Company of Rockford, Ill. Mr. Rosenbloom has been in charge of the Behr Machine Tool and Industrial Division for the last six years.

A. H. Rosenbloom

Spencer A. Tucker

Spencer A. Tucker has been appointed works manager in charge of manufacturing and engineering for the Weisberg-Baer Company of Long Island City, N. Y.

F. O. Marion is the new sales manager for the Masonite Corporation. Mr. Marion succeeds the late Walter G. Stromquist. He will direct all sales activities, including advertising and sales promotion.

The Irvington Machine Works, Portland, Ore., has appointed **W. A. (Bill) Jones** as sales manager. Irvington Machine Works, established since 1907, specializes in the manufacture of precision trimming and cut-off equipment.

H. M. Lineweaver

W. A. Jones

Forest Fiber Products Company, Forest Grove, Oregon has appointed **Hugh M. Lineweaver** as sales promotion director. The firm manufactures a controlled process panel of Douglas fir fibers for use in building construction and industrial fabrication.

YOU'LL PROFIT 5 WAYS with MOISTURE REGISTER

With Moisture Register Instruments you

- **Make sure your lumber meets moisture specifications for grade.**
- **Save freight costs. Don't pay for excess moisture.**
- **Save man hours, Moisture Register tests in seconds. Oven tests take hours.**
- **Save on overhead. Wet lumber increases tool maintenance.**
- **Reduce customer complaints and rejects. Insure consistent production quality.**

With Moisture Register, you know that wood will be exactly right for most efficient bonding, cutting, fitting and finishing.

Testing moisture content of panelling with Model RF4 at Morris Furniture Company, Los Angeles, manufacturers of high quality furniture.

Models priced from $75.00 to $148.50 test 80 wood varieties, 0 to 25%, in 3 seconds or less. Rugged, portable. One-year guarantee. Write for complete information.

10-DAY FREE TRIAL on any model! No obligation. Write today, outlining your requirements.

ELECTRONIC MOISTURE REGISTER

Mfd. by Moisture Register Co.
1510 W. Chestnut St.
Alhambra, Calif.

Wirebound Box Manufacturers Association elected **A. L. Whiton** of Chicago president. During World War II Mr. Whiton was a civilian consultant in the shipping container industry.

A. L. Whiton

H. K. Wilson

Appointment of **Harold K. Wilson** as manager of the New Product Department of Georgia-Pacific Plywood & Lumber Company has been announced. His headquarters will be at the Olympia, Wash. plant and his work will be the development and application of plywood products into their many new uses.

Howard B. Garrison has been appointed manager of the West Coast and Wood Products Division of the Evans Products Company, Plymouth, Mich.

The Davis Plywood Corporation announce the promotion of **L. S. ("Pete") Gray** as branch manager of their Rochester, N. Y. warehouse.

American Forest Products Industries has added a second field manager to their Southern staff. He is **Edward L. De Motte**, Montgomery, Ala.

MONSANTO OPENS NEW OFFICE

The opening of a branch office in St. Louis, Mo., by the Western Division of Monsanto Chemical Company was recently announced. The new office will handle the sales and distribution of the division's resin-based surface coating sold under the trade name Rez. Sales representatives will be Elmer Weil and Edward Kuntz. Location of the office will be at the Company's headquarters, 1700 S. 2nd St.

HARDWOOD DIMENSION MANUFACTURERS MEET

Because of editorial deadlines we cannot present as full a report on this association meeting as we should like. The annual meeting was held at Edgewater Park, Miss., Feb. 28-March 1. Plans for the meeting included spending much of the time in discussions and conferences specifically tied into the need for the Association's affiliation with the national defense and mobilization program.

We hope in a later issue of WOOD WORKING DIGEST to present more of the specific subject matter discussed at this important conference.

INDUSTRIAL PLYWOOD MOVES

In the heart of Long Island's growing industrial and home-building area, New York's newest plywood warehouse has been completed. This will be the new home of the Industrial Plywood Company of Jamaica, L. I. The new building is a fireproof structure especially designed to handle a potential turn-over of 50 million feet of plywood per year.

GEORGE M. HUNT RETIRES

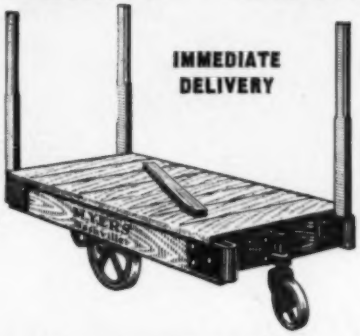
Completing 40 years of continuous work with the Federal Service, George M. Hunt, director of the U. S. Forest Laboratory at Madison, Wis., since March 1946, retires as of March 31, 1951. He will be succeeded by Dr. J. Alfred Hall, now director of the Pacific Northwest Forest and Range Experiment Station of the Forest Service in Portland, Oregon.

Mr. Hunt began his career in 1911 as a chemist for the Forest Service in San Francisco and came to the Laboratory in 1913 to take up research in wood preservation that was eventually to establish him as an international authority on the subject. In 1920 he was placed in full charge of the Laboratory's research in preservatives, fireproofing, glues and gluing and wood finishing. In 1944 he became assistant director.

Dr. Hall was a member of the Laboratory staff from 1930 to 1937, when he was appointed assistant director of the California Forest and Range Experiment Station at Berkeley, Calif. Since then he has been director of the Central States Forest Experiment Station at Columbus, Ohio. During World War II he supervised important research on rubber production.

"I don't care how much a man talks, if he will only say it in a few words."
—Josh Billings.

MYERS "TOUGH BUILT" TRUCKS



Capacities: 1500 to 5000 lbs.
Platform Sizes: 21 x 42" to 36 x 72"

Catalog and Prices upon Request

MYERS TRUCK & CASTER CO.
914 Trinity Lane . . . Nashville 7, Tenn.

HARTFORD CLAMPS
Since 1915

Deep Engagement Clamps

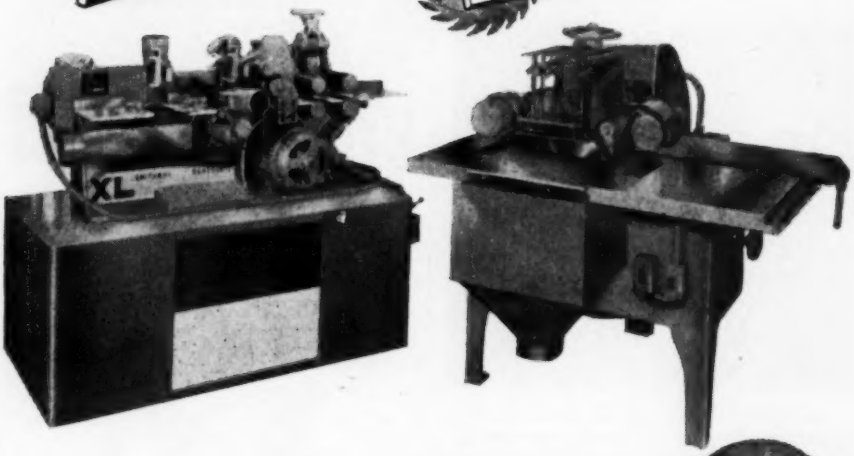
Designed for long, hard usage. Locking device locks instantly; will not slip or stick.

HARTFORD CLAMP COMPANY • EAST HARTFORD, CONN.

XL 2000 SERIES

MOLDMATCHER

XL RIPPER



If you work wood YOU NEED AN XL

3 Models to choose from. Capacity to 2"x6". A production machine in every sense of the word. Economical to buy, operate & maintain. Modern design. High speed ball bearing. Nearly 2000 in use all over the world. Light weight with no sacrifice of strength or rigidity. Infinitely variable feed speeds.

A SELF-FEED RIPSAW, available in 10 & 20 HP Models. No belts, saw arbor is integral part of motor. Rips stock to 4" thick. Feed speeds to 190 f.p.m. Rips stock as short as 4" on a regular production basis. Unbelievable performance on any job. Rugged modern construction.

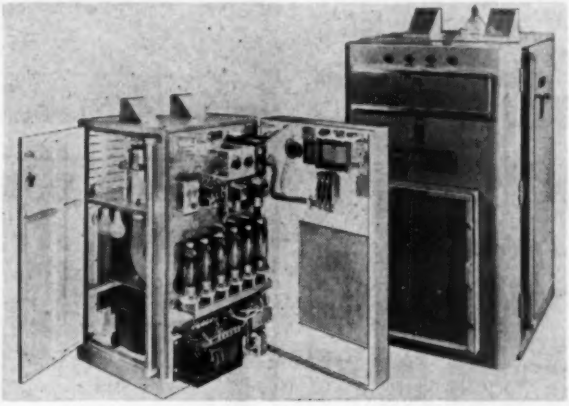
SMITHWAY MACHINE CO.

4617 AIRPORT WAY • SEATTLE, WASHINGTON

AUTHORIZED XL DISTRIBUTORS EVERYWHERE THROUGHOUT THE COUNTRY

Equipment and Supplies for the WOOD WORKING INDUSTRY

HIGH FREQUENCY GENERATORS



The Thermatron Division of the Radio Receptor Co., New York manufacturer of electronic heating and sealing equipment for general industry, has announced that they are setting up a separate department for wood bonding operations. This section will deal specifically with the woodworking industry's bonding and wood bending requirements.

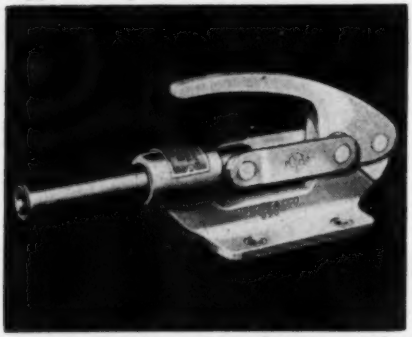
Thermatron electronic generators and equipment will be available for fast glue drying of wood assemblies, molding of laminated parts, bonding of plywood, etc. The Company designs and manufactures all special jigs and fixtures for these operations in their Brooklyn plant. The high frequency generators which are also made in the Brooklyn plant range from ½ kw to 6 kw, or larger for special requirements.

The Thermatron service to each purchaser consists of a thorough survey of his product and production, followed by a recommendation for specific generators and jigs to meet his particular requirements.

For complete information on the advantages of this equipment to your own manufacturing operation, write Thermatron Div., Radio Receptor Co., Dept. WD, 251 W. 19th St., New York 11, N.Y.

PLUNGER-TYPE TOGGLE CLAMP

A powerful heavy duty plunger type toggle clamp has been added to the

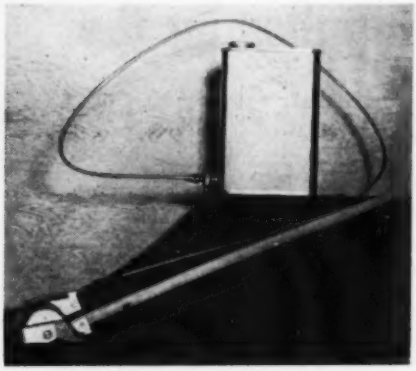


"De-Sta-Co" line of production work-holding tools. Known as De-Sta-Co No. 650, the new clamp positions and holds work firmly in place with a toggle locking action said to deliver holding pressures up to 4000 lbs.

Self-feeding lubricator pad on top of plunger housing assures proper lubrication of plunger. Overall dimensions: 3" wide, 4½" high, 11¼" long; weight, 5 lb. 10 oz. Bulletin available from Detroit Stamping Co., 312 Midland Ave., Detroit 3, Mich.

EXPEL-O-LATOR CLEANS ABRASIVES

The new pulp and resin Custom Expel-o-lator is said to clean abrasives



44" vertical band resaw

WRITE

McDONOUGH MANUFACTURING CO.

Incorporated 1888

EAU CLAIRE, WISCONSIN

"World's Largest Producer of Band Resaws"

Prompt Delivery Factory Trucks

Size 1
24" x 48"
Size 2
30" x 48"
Size 3
30" x 60"

Ask For Literature

EFFICIENT, ECONOMICAL

Jakes Foundry Co.

400 - 29th Ave. Nashville, Tenn

on drum sanders at great savings to the woodworking industry. The machine is simply designed, compact and weighs less than five pounds. It can quickly be changed from one roller to another.

By cleaning average quality abrasives from four to six times, the machine gives longer work life to sandpaper.

For additional information write Custom Chemical Co., Dept. WD, P. O. Box 32, Redondo Beach, Calif.

SHUTTER GROOVING MACHINE

This machine can be used for cutting grooves in window shutters, doors or anything with louvers. The cutterhead runs at 9000 rpm and can be adjusted to any angle for left or right horizontal and vertical slots. The grooves are cut to a flat bottom, therefore the beveling of the edge on the slots is eliminated. The clamping, the infeed and the grooving is performed with one lever movement.

The maximum milling length is $2\frac{9}{16}$"; distance between the grooves is regulated by a toothed template fitted with two different pitches—$1\frac{1}{8}$" and $1\frac{1}{4}$". Additional pitch can be supplied upon request.

The three-phase A.C. motor can be connected on any power line, but it is necessary to indicate voltage when ordering.

Complete details from Festo Special

MORE SPEED MORE SUPPORT

PADDOCK BALL-BEARING BAND-SAW GUIDES

IMMEDIATE DELIVERY—WRITE TODAY!

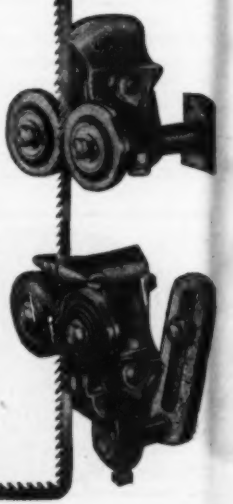
MORE WORK

For faster band-saw production—greater safety to operators—cutting down saw-blade breakage, install PADDOCK BALL-BEARING BAND-SAW GUIDES. Thousands now in use in every type of industry. Ball-Bearing wheels (inter-changeable) running with the blade give strong, friction-free support and in effect hold working portion of blade as if in a frame. Very reasonably priced! Can be used on old or new band-saws for greater economy and faster production. Write for circular and price.

PADDOCK TOOL COMPANY

Guide Makers Since 1920

1418 Walnut Street Kansas City 6, Mo.



Paddock

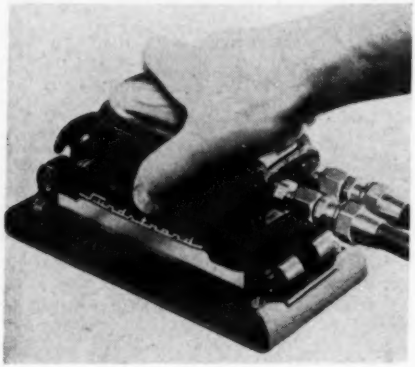
BALL-BEARING

BAND SAW GUIDES

Woodworking Machines, Dept. WD, 745 51st St., Brooklyn, N. Y.

SINGLE PAD AIR SANDER

Development of a new straight-line action single pad air sander has been announced by the Pneumatic Division of the Sundstrand Machine Tool Company. Due to its straight-line action, the sander leaves no swirls or pressure marks, we are told. This is a primary



feature in work where an extra smooth surface is required.

Also, the Sundstrand sander operates both wet or dry, making it suitable for use on a wide variety of finishing operations. Small and compact, this new sander is said to be easy to handle and to work over both flat or curved surfaces.

Complete details from the Sundstrand Machine Co., Dept. WD, Pneumatic Div., Rockford, Ill.

PLATED EFFECT FINISHES

A new line of metallic bronze lacquer finishes has been announced by the National Lacquer and Paint Co., Inc. The new line will be offered only to the industrial trade, and will not be packaged for resale.

Fifteen shades are included in the standard line with other colors supplied on special order. All of them are designed to simulate closely the appearance of plated metal. Another unusual feature is that "casting of shadows" has been greatly eliminated. Color and reflectivity are always the same when viewed from any angle. The manufacturer claims the products to be non-caking, non-jelling and relatively free from settling-out difficulties. All colors are warranted to be light-fast and non-fading.

These bronze lacquers are recommended for any purpose where a metallic plated effect is desired. They are widely used for finishing floor and table lamps, caskets, ash trays, book ends, etc. Parts or articles of wood, metal or plastic can be finished with them.

Testing samples will be sent to those manufacturers who supply detail information regarding their requirements and a color sample of the shade wanted. Write to the Company, Dept. WD, 7415 S. Green St., Chicago, Ill.

Additional information on any product mentioned in this issue is available from our Market Service.

IMPROVED Ball Bearing Shaper Collars

Friction between collar and pattern entirely eliminated — no more burning.

Outer rim is independent of the slotted collar and revolves with the feed of the work.

Collars can also be supplied without grooves for use with solid steel cutters.

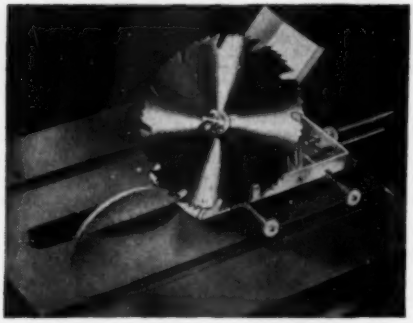
Give diameter of collar and size of hole.

GUSTAFSON & SCOTT MFG. CO.

1637 Lowell Avenue Chicago 39, Illinois

CIRCULAR SAW SHARPENER

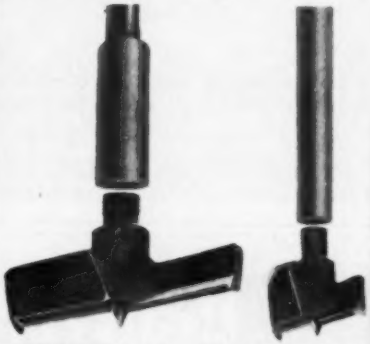
The "Tru-Circle" saw sharpener, a really low cost fixture for grinding circular saw blades to perfection, has been brought out by A. D. McBurney, 317 East 4th Street, Los Angeles 13, California. Designed to fit all known saw tables, the extremely simple jig will gum, joint and sharpen combination, crosscut, rip or novelty blades from 6" to 10" in diameter. The jig also may be used for touching up the raker teeth of combination blades.



In basic form, the "Tru-Circle" (pat. pend.), is a simple metal frame upon which is secured an upright carrier jig. Fixed with adjustable outriggers and grippers the entire unit is movable forward or backward in the mitre slots of the saw blade. The carrier jig is designed to hold all diameters of blades within its 6" - 10" range and is itself mounted at an angle to the grinding stone fixed on the saw's arbor. This angle may be changed at will by moving supporting legs up or down a series of holes provided in both sides of the carrier jig. Thus, for application with rip saw blades, as an example, the position of the carrier jig may be set at a right angle in relation to the center of the grinding wheel. The jig itself presents two additional angles to the edge of the grinding wheel so that blades may be mounted and secured to the right-hand or left-hand angle of the carrier jig, according to the set of the saw teeth being reconditioned.

PLANETOR CHIP FLOW MACHINE BITS

Supreme in smoothness, speed, endurance

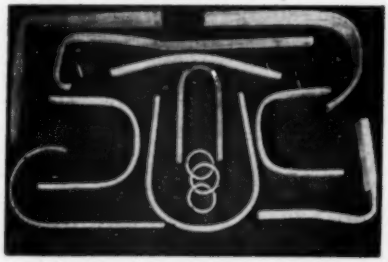


STOCK SIZES: 1" to 4" by 16ths. 4⅛" to 6" by 8ths on special order.

Dealers in Principal Cities

PRICE & RUTZEBECK

BOX 30 HAYWARD, CALIF.



BENT WOOD

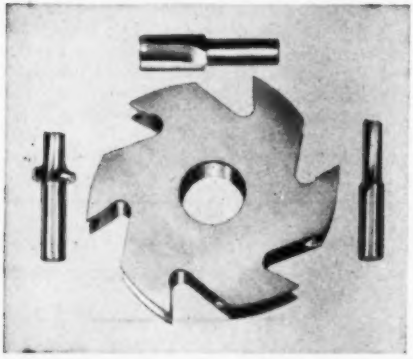
If it Bends We'll Bend It!

Standard and Custom Bends Our Specialty

Sorensen & Peters, Inc.

Box 145-H Westerly, R.I.

Sterling Quality
Woodworking TOOLS



Router Bits - Form Cutters
Shaper Cutters - Sash Cutters

Some dealer territories open

STERLING CUTTER & MFG. CO.
728 Sixth Street **Rockford, Illinois**

CHAIN MORTISE
EQUIPMENT
By
FIELD
SINCE 1880

Write for information on chain grinders for sharpening your Mortise Chains.

NEW ENGLAND'S
WOODWORKING
MACHINERY DEPOT

WILLIAM H. FIELD CO.
327 DORCHESTER AVENUE
BOSTON 27, MASS.

An accurate 10° bevel is ground on the back of the teeth, while at the same time a 15° bevel is ground on the front of the teeth.

A UNIQUE FINISHING TOOL

A tool that's seen in the production lines of a great many wood finishing departments these days is the Vonnegut brush-backed polishing head. The head consists of two principal parts: an outer shell or drum, holding 32 replaceable brushes (16 brushes in the light, "portable" models), and a center spool on which are coiled 32 (or 16) strips of abrasive cloth. The abrasive strips usually are extended about ⅛" beyond the brush ends. In operation, the brush bristles force the abrasive tips into depressions and also allow them to ride over projections of the work-piece surfaces. The ability to follow irregular surfaces instead of reshaping them, makes the head ideal for finishing operations on mouldings, carvings, beads, flutes, etc.

Since an entirely different set of results may be obtained with the same head, simply by changing the grade and grit of abrasive strips used, it has many applications.

The Vonnegut Corporation reports that new applications—suggested by the

individual problems of each manufacturer—are found almost daily. The more common uses are: sanding wood, plastics, ceramics, leather; sanding stain, primer and filler coats; removing bubbles and other defects from paint and enamel finish coats; feathering-out operations following removal of bubbles and other defects.

A bulletin containing complete information about the head—its operation, application, details of construction, specifications, etc.—may be obtained by writing to the Vonnegut Moulder Corporation, 1819 Madison Avenue, Indianapolis 25, Indiana. Ask for Bulletin Number Sixty-One.

HY-PRO PHILLIPS INSERT BIT HOLDER STRENGTHENED GREATLY BY REDESIGN

The Continental Screw Company of New Bedford, Mass., states that its subsidiary, the Hy-Pro Tool Company, reports remarkable results from the redesigned Hy-Pro Phillips insert bit holder which this company produces.

By actual laboratory and field tests the redesigned Hy-Pro Phillips bit holder has 20 times the strength of the original design. This new holder is permanently rigid—essentially a one-piece, solid tool that provides time-saving, efficient service in mass production power driving or small scale hand driving of Phillips recessed head screws.

Widely accepted upon its introduction into the field last year, the Hy-Pro Phillips insert bit and holder has proved to be an invaluable tool on the assembly line where the long life bit with the perfect fit has averaged 25% or more longer life than bits formerly used. Hy-Pro Phillips insert bits are precision cold-forged by the same process that produces the billions of Phillips recessed head screws used throughout industry. This identical process insures a perfect mated fit.

A descriptive illustrated folder with price list will be sent upon request to Continental Screw Company, Dept. WD, New Bedford, Mass.

Burton Saw Co.

WORCESTER 8, MASS.

MANUFACTURERS OF

- LOG BANDS "that stand the feed"
- BAND RESAWS "that cut straight"
- NARROW BANDS "that last longer"

Give Your Band Saw Operator A Treat

A millman 2000 miles away telephoned to see if we would recondition his old saws (other makes) "to cut like the new one" we had just made for him.

SEND US YOUR ORDER TODAY

Better-Built Trucks by TOWSLEY

give better service, last longer, cost less in the long run.

Phone, wire, or write for quotations!

TOWSLEY TRUCKS, INC.

1760 Elmore St. Cincinnati 23, O.

CUT COSTS, make stronger assemblies with QUALITY CONTROLLED "ROCKFORD-PHILLIPS" or SLOTTED HEAD WOOD SCREWS.
Stock of all sizes and head styles ready for shipment.
FOR COMPLETE INFORMATION AND PRICE LISTS WRITE FOR OUR NEW WOOD SCREW Catalogs No. 202 and No. 106.
We fabricate a complete line of STANDARD • AUTOMOTIVE • AIRCRAFT & SPECIAL Threaded Fasteners.
"Quality Controlled Products"
"ROCKFORD" Screw Products Co.
2501 S. Ninth Street
ROCKFORD, ILLINOIS
Phone: 4-9441 or Wire: RK 88

BALDWIN TESTING MACHINE

In quality control studies of glues and wood joints, a leading part is taken by this universal testing machine in the research laboratory of Timber Engineering Company, Washington, D.C. High accuracy is required in testing glued joints in order to meet A.S.T.N. specifications.

The machine is always a center of activity when the Company holds its periodical, five-day gluing school. One of its jobs then is to compare the efficiency of homemade shear testing machines and to calibrate them for testing small standard shear test specimens. The school is open to representatives of any company interested in improving its gluing methods or glues.

In the test being demonstrated, a standard block shear tool is used in the Baldwin testing machine. Standard shear test specimens are made of hard maple having a specific gravity of 0.65 to 0.71. Blocks are 2 x 1¾ x ¾ inches, two being glued together with a joint area of 3 sq. in., leaving ¼-inch overhangs on the 2-inch ends. If the glue is strong enough the block will shear through the wood adjoining the plane of the glue surfaces. Shear blocks bonded with modern resin adhesives frequently develop strengths exceeding 4000 lb. per sq. inch.

To meet all load requirements with maximum accuracy, six load ranges up to 0-200,000 lb. are provided by the two 24-inch diameter dials. The 0-20,000-lb. range, for example, would show approximately 20 lb. for each 1/16 inch of scale.

G & S Motorized Drum Sander

Simple — Inexpensive — and a REAL money saver when sanding irregular and contour work with and across the grain. Available as 2, 3, or 4 drum machine, equipped with pneumatic or hardwood drums.

GUSTAFSON & SCOTT MFG. CO.
1637 N. Lowell Ave. Chicago 39, Ill.

Carter

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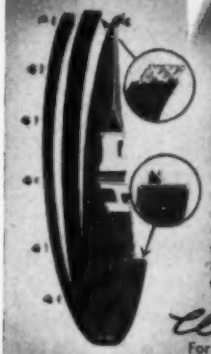

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Carter rigid Wheels and 30" & 36" Quick-Change Tires are for heavy-duty high-speed operations. Tires won't throw even at 1800 r.p.m. Changed in 10 min. 20 years service on best machines. Carter products universally accepted as standard equipment by leading bandsaw manufacturers.

Write — For free illustrated folder!

CARTER PRODUCTS COMPANY INC.
55 Mount Vernon N.W. Grand Rapids 4, Mich.

-Hamilton-
FACTORY TRUCKS

ESPECIALLY DESIGNED FOR THE WOOD-WORKING INDUSTRY

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Cap. 1500 lbs.

Heavy Duty Wheels and Casters

Standard sizes 24" x 48"—30" x 48"—30" x 60". Special sizes and styles to order—capacities up to 7500 lbs.

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You'll get a cleaner surface with the improved DETROIT HANDY "TAC" RAG. Standard of your FINISHING INDUSTRY for 16 years. Removes all particles of dust, lint and sand. Non-inflammable! Order from your supplier today, or send for sample.

DETROIT HANDY "TAC" RAG

DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

High Speed HANGER BOLT DRIVING . . .

A NEW, FAST OPERATION TIMED IN SECONDS!

This tool is used by a majority of plants where hanger bolt driving is done on a high production basis. Can be operated at any speed which is safe for driving the hanger bolt. (It is not necessary to stop rotation at any time.)

- AUTOMATIC TAKE-UP FOR WEAR ON JAWS
- REVERSING POSITION OF CLUTCH GIVES DOUBLE WEAR AT HALF COST
- AFFORDS ACCURATE PROJECTION HEIGHTS
- USE WITH ANY AIR OR ELECTRIC DRILL OR DRILL PRESS

Write for Free Literature, TODAY!

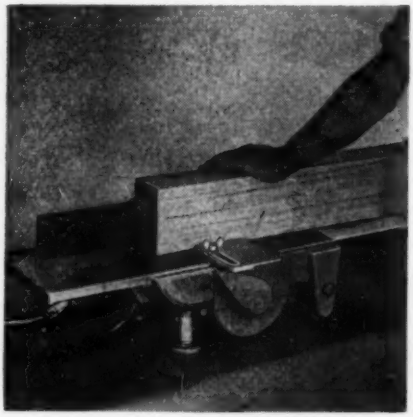
TITAN TOOL CO.
Production Tools
49 Main St. FAIRVIEW, PA.

PORTABLE PLANING MACHINE

The new portable electric hand-operated planing machine can be used for a number of purposes. Here are a few of them: drilling, grinding, dressing, planing and sawing.

The machine is enclosed in a stable, well-shaped casing in which the cutter spindle rests upon a bed of strong ball bearings. The switch is enclosed and protected in the casing. Depth of cutting to ⅛", is adjusted by a short turn of the handle. Width of the planing surface is 10¼".

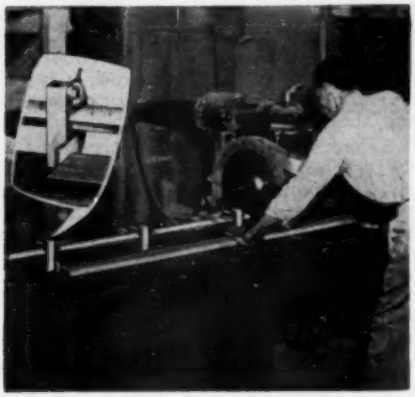
A few of the features the manufacturer stresses include: light weight with high performance; easy operation and no servicing necessary. The hinged protective cover for the cutter spindle and shavings removal channel are two of the safety features.



Information on specifications, etc. is available from the R. Caluwaerts Co., 1 W. 67th St., New York 23, N.Y. Ask about the Holz-her portable planer.

ADJUSTABLE STOP GAUGE

Designed to put power cut-off sawing on a mass production basis, a device known as the Comet adjustable stop gauge has been introduced by Consolidated Machinery and Supply Co.



According to the manufacturer, the gauge will increase the production output of any power saw. Several predetermined lengths can be set at one time and accurate cut-off made as rapidly as the saw can be pulled through the work.

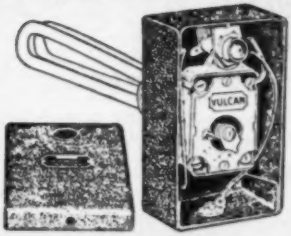
All stop blocks have four sq. inches of gripping surface and can be pre-set at any position without using a wrench. Additional stops can be added at any time without disturbing other stops already positioned on the bar.

Further information from Consolidated Machinery & Supply Co., Ltd., 2031 Santa Fe Ave., Los Angeles 21, Calif.

SMITHWAY DEMONSTRATIONS

The Smithway Machine Company of Seattle, Wash., manufacturers of the XL moldmatcher and XL ripper, have introduced a novel method of demonstrating their machines. Two demon-

VULCAN



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Hot Water Heaters

Thermostatically controlled easily, quickly and economically installed in any present equipment that requires heat for liquids, without disturbing existing piping.

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A Dependable, Inexpensive Addition to Your Material Handling Equipment.

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The lowest price combination available in semi-mobile factory or shop handling equipment. You can't beat it for semi-heavy work or convenience. Equipped with steel or rubber wheels.

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283-87 Front Ave. N.W.
Grand Rapids 4, Michigan

DOWEL PINS

HIGHEST QUALITY

Now available in kiln dried Beech, Hickory and Hard Maple in ¼", 5/16", ⅜", 7/16", ½", ⅝" and ¾" sizes. Spiral grooved. Also ready for shipment are Dowel Rods made from Hard woods in sizes 3/16" through 1-7/16". Let us quote on your requirements. Prompt Shipment.

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Supreme BAND SAWS

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SUPREME BAND SAWS cut faster . . . have increased cutting capacity with minimum breakage! Present day high speed equipment demands Supreme Saws. Free from kinks and imperfections. Made from the finest Special Nickel Alloy Steels, tempered for toughness . . . to stay sharp! There is a Supreme Band Saw for every industry . . . for every material. Special purpose saws are made to order.

WRITE TODAY FOR YOUR COPY OF THE "SUPREME" CATALOG NO. WWD

THE SAW & KNIFE SPECIALTY CO., INC.

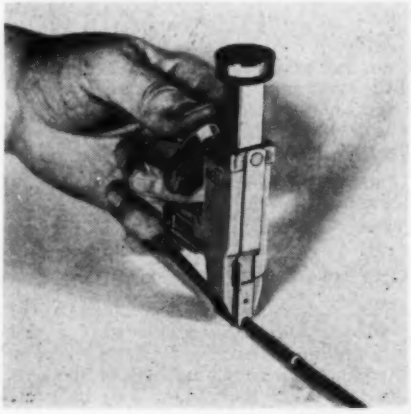
strator units tour the entire country, bringing the molder and power feed rip saw directly to woodworking plants and shops.

Actual on-the-spot demonstrations of the machines are made. This type of sales promotion enables the prospective customer to examine machines and to see them in action. Demonstrations are currently being made throughout the south.

Write to Dept. WD, Smithway Machine Co., 4617 Airport Way, Seattle, Wash., for additional information.

TINY AUTOMATIC TACKER

Tiny but efficient, this new tacker speedily staples braided, rubber-coated, single and double strand wire and hollow tube lines. Front and rear guides circle the wire and permit rapid draw-



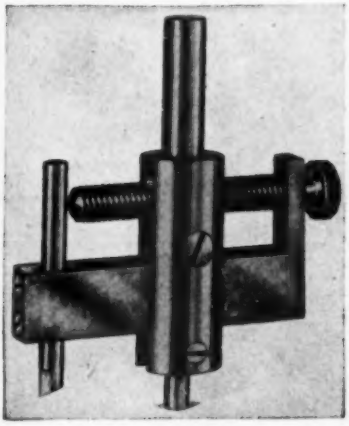
ing around difficult angles or corners, along baseboards, plaster walls, window frames, etc.

The machine uses an improved staple, made in several colors, whose driving points easily penetrate hard and soft woods, plaster and composition board (with holding power up to 64 lbs.). It can be used on such jobs as television, radio, music box and pinball wire installations, burglar alarm and intercommunication systems.

Complete information from the Heller Co., 2147 N. Superior Ave., Cleveland, Ohio.

MICRO CIRCLE CUTTER

The Micro Circle cutter has several unique features that make it useful in woodworking plants, defense work and small shops. Extra heavy construction of the main beam and body make it useful for production jobs as well as experimental work. The cutter is adjustable in an infinite number of hole diameters within its range.



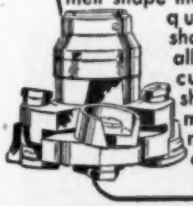
Two types are available; round shank for drill presses or hand drills and square tapered shank for hand braces. Maximum hold diameter is 4" for model No. 1 and 6" for model No. 5. Complete information from the manufacturer, Precise Measurements Co., Dept. WD, 942 Kings Highway, Brooklyn, N. Y.

"Jorgensen"
CLAMPS

Jorgensen offers a complete selection: Hand Screws, Drop Forged and Malleable "C" Clamps, Steel Bar Clamps, "Pony" Clamp Fittings and miniature "C" Clamps — the very best in service giving quality.

ADJUSTABLE CLAMP CO.
"The Clamp Folks"
418 N. Ashland Ave., Chicago, 22, U. S. A.

UNIFORMITY OF SASH PATTERN IS YOURS... INDEFINITELY
when you use
SHIMER SASH HEADS
WITH LONG-LIFE CIRCULAR BITS



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SHIMER

NEW TYPE POWER SAW

Cross-cuts, rips, notches and other cutting operations are performed by this new portable pneumatic-powered saw now being made by the Wright Power & Tool Corp.

The twin interlocked, reciprocating saw blades duplicate handsaw accuracy and maneuverability. The saw is easily adjustable for high speed cutting in any position. Saw teeth can be resharpened and set the same as any handsaw.

Safety features include the two-way locking of the tempered blades to prevent them from breaking loose; a safety throttle for quick stoppage during sawing; and the design which throws sawdust away from the operator so that it will not clog or bind the blades.

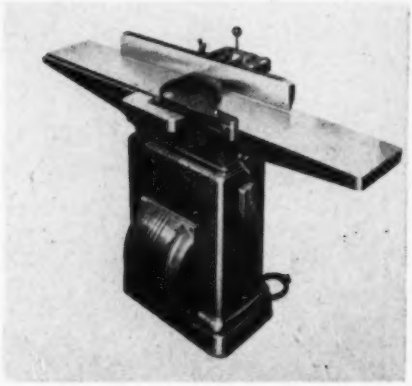
Consuming less than 60 cu. ft. of air per min. at 90 lb. air pressure, the saw will have many uses in the entire woodworking field.

Descriptive folder from Wright Power Saw & Tool Corp., Dept. WD, 292 Longbrook Ave., Stratford, Conn.

DELTA JOINTER

A new Delta-Crescent 8" jointer is now being offered to the trade. In announcing the machine a Company spokesman said, "Here's a jointer that meets the needs of many woodworking plants and departments. The overall table is really big—60" long by 9¾" wide. To insure accurate alignment, the tables are finish-ground after assembly on the base. The cast iron fence is 4" high by 34" long."

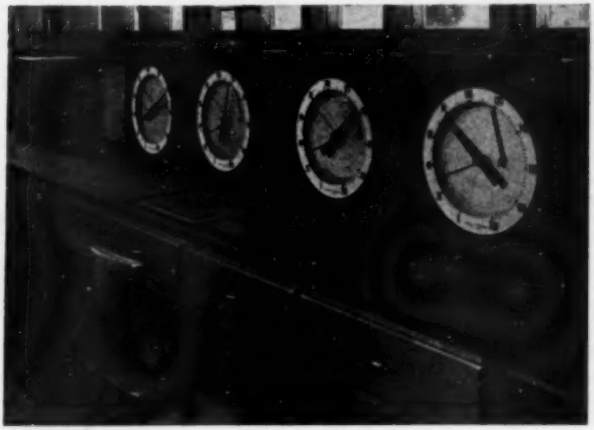
The cutterhead is a 4-knife type and makes 16,400 cuts per minute. Delta engineers report that the jointer has a cutterhead speed of 4100 rpm. Cutting and rabbeting capacities are 8" wide and ½" deep. Fence tilts 45° right and left. Motor, belt and pulleys are enclosed in a cast iron stand.



Descriptive literature from Dept. WD, Rockwell Mfg. Co., 600 E. Vienna, Milwaukee, Wis.

If you make mistakes, it will be more to your credit if you make a new one each time.

— Selected



IMRIE

ELECTRONIK POTENTIOMETER . . .
MULTIPLE THERMOCOUPLE SYSTEM

This exclusive IMRIE control system assures SCIENTIFIC . . . HIGH QUALITY drying of lumber. No other system of dry kiln control provides the accurate readings and recordings of temperature and humidity at so many points in the kiln . . . plus really DEPENDABLE AUTOMATIC control. Users of this NEW system report faster . . . unusually safe and accurate drying with very low percentage of degrade. IMRIE DRY KILNS are famous for

- HIGH QUALITY DRYING
- SAFETY AND DEPENDABILITY
- HIGHER PRODUCTIVITY
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This NEW type of control system coupled with IMRIE Sipho-Fan Kilns means all Imrie users get "PERFECT DRYING EVERY TIME."

*WRITE FOR YOUR COPY OF "ACCURATE . . . SCIENTIFIC . . . ECONOMICAL LUMBER DRYING."

IMRIE DRY KILN COMPANY

PEARL & OTTAWA GRAND RAPIDS, MICHIGAN

KELLER ENLARGES PLANT

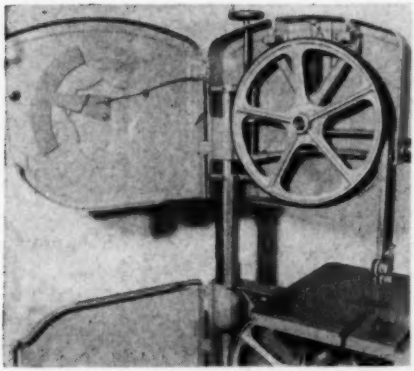
Keller Products, Inc. of Manchester, N. H., has now completed the addition of two new wings to their manufacturing and warehouse plant. New equipment has helped to step up production capacity. Continuing growth has forced Keller Products to complete plans for a third wing which is scheduled to get underway in early spring.

The Company has been providing a complete plywood service—design, engineering, tool room and fabrication.

THE TYLER SPYRAL BLADE

A blade that cuts in any direction is a phenomenon that has captured the imagination—a saw blade for use on coping saws, hacksaws and jigsaws. This is difficult enough, but imagine a blade flexible enough to run on bandsaw wheels. This is the way the Tyler Manufacturing Company describes their new Spyral saw blade.

The blade when first introduced was immediately popular with small shops and home craftsmen. However, the large

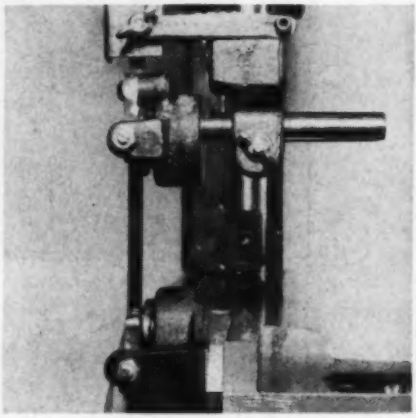


Front view showing machine with doors open. This view shows the upper wheel tilting mechanism. Note that the hinge center line of the tilting "V" shaped yolk is directly on top and in the center of the wheel. This yolk is held back against the tilting hand screw by the tension spring shown behind the yolk. Instead of pivoting the wheel at its center as in all other bandsaws, the wheel is now pivoted at the top. Another feature is the vernier-like adjustment on the adjustment screw. It requires considerable movement of the screw to make the blade move and thereby gives better control. Also note the heavy alloy blade guard mounted on the vertical tube. The table is 16"x17"

companies followed along and are now using the blade, we are told. Simplicity of maintenance helped to convince them.

An unusual feature of Spryal blades is the fact that only one pitch has been found necessary for cutting all material. Only one blade is required for all materials. The special chrome-impregnated blade is recommended for all ferrous metals; the spring-tempered blade for all other materials. The hard blade, naturally, would suffice for all materials; but, for non-ferrous materials, the spring-tempered blade is more economical. At first Tyler felt that a Spyral blade of different pitch might be required for each material. However, years of experimentation revealed that the pitch ultimately selected would not only cut wood and leave a finished surface, but did so just as easily on lead and other such soft materials.

The Spyral blade can be welded on conventional welders, it is said. If the welder works in the narrow blade zone, and care is taken in annealing, there is no reason for trouble. Tests indicate that the blade has at least as long a life as a flat blade.



Side view of the new blade guides. The upper guide is adjustable in and out from the guide bar simply by loosening the wing nut on the side. The lower guide can be installed with a single Allen screw. Adjust the upper band wheel tilting screw so that the blade runs against the lower steel disc lightly, then slide the upper guide assembly out until its steel disc backs up the blade slightly; tighten the wing nut, adjust the guide fingers so that they contact the side of the blade lightly. Then the machine is set.

For complete information write Dept. WD, Tyler Manufacturing Co., Los Angeles 45, Calif., or to the eastern office, Dept. WD, 60 Beaver St., New York 4, N. Y.

WANTED

Water Storage Tank, 5,000 to 25,000 gal. capacity. Good Condition.

Phone, Wire or Write

M. GARSON COMPANY

P. O. Box 895 **Norfolk 1, Va.**

Phone: 43865

HYDRAULIC PRESS FOR GLUE JOINTS

The Dake hydraulic press is being used in the manufacture of cabinets and a number of other woodworking applications. These presses are said to put the "squeeze" on cabinets all during the drying time and as a result of the sustained pressure, the glue joints are very solid and substantial.

Additional information about these gluing presses may be obtained by writing Dake Engine Company, Dept. WD, Grand Haven, Mich.

COLD ADHESIVE FOR JOINT-ASSEMBLY

A cold adhesive, designed for joint-assembly operations in the woodworking industry, is announced by Federal Adhesives Corp.

The new product, known as Clag was developed by their laboratories in an attempt to help the woodworking industry conserve cold setting resin adhesives commonly used for wood gluing. Tests indicate that Clag gives a strong joint and is easy to use, no heating is necessary. It may be diluted with water as required.

Complete information from the Company, Dept. WD, 210 Wythe Ave., Brooklyn 11, N. Y.

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ONE OF OVER 1000
WILSON OPERATIONS

A WILSON IS YOUR BEST INVESTMENT

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RADIAL CUTTING MACHINE

MAKE YOUR *"PILE OF STOCK"*
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WILSON

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MEDIA, PENNSYLVANIA, U.S.A.
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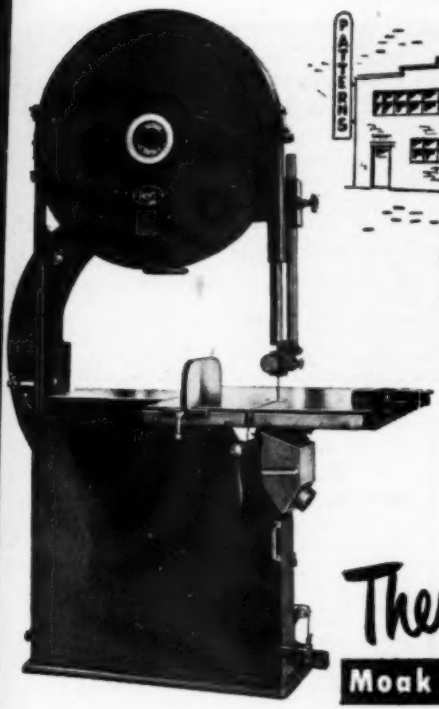
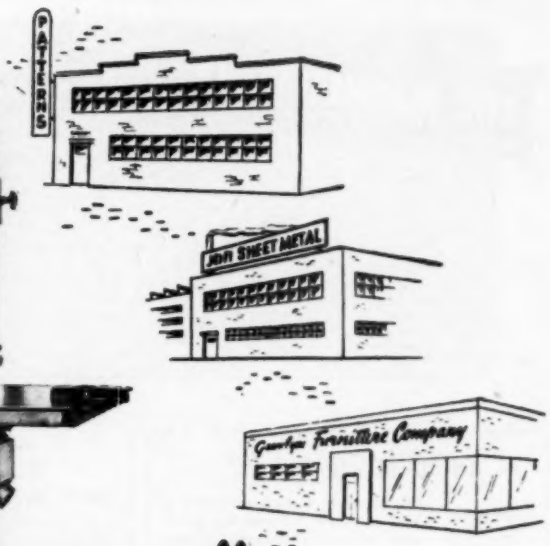
Mechanics Through The Ages

DURING TIMES OF WAR . . . WHEN THE DEMAND FOR WEAPONS EXCEEDED THE SUPPLY. . . THE FAMED ARMORERS OF MEDIAEVAL FLORENCE, ITALY, GOT TOUGH. THEY DEMANDED CASH FROM THEIR CUSTOMERS BEFORE DELIVERING THE ARMS THEY MADE.

The RIFLE FAVORED BY DAVY CROCKETT, FAMED AMERICAN FRONTIERSMAN, WAS MADE IN VERMONT BY A COMPANY ORIGINALLY SET UP TO MAKE ROTARY FIRE PUMPS ON THE INTERCHANGEABLE SYSTEM.

When THEIR TOOLS NEEDED MENDING, THE FARMERS OF ANCIENT CEYLON WERE OBLIGED BY LAW TO TAKE THEIR WORK TO A DESIGNATED BLACKSMITH AND TO PAY HIM IN GRAIN AT HARVEST TIME.





They all use...

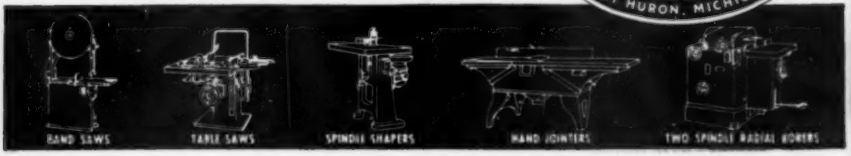
Moak High Speed Band Saws

FOR EFFECTIVE CUTTING OF A WIDE RANGE OF MATERIALS

A standard tool of woodworking shops, Moak High Speed Band Saws are proving their versatility in cutting such materials as pressed and plied boards, plastic laminates, corrugated paper, alloys, sheet metals and rolls of glass fibrous material. Functional design includes two-wheel equalized brakes for safety; "Lubricated for Life" bearings to cut maintenance costs. Wheel size is 36", available in three drives; also made with a 4-speed transmission.

Get the facts on Moak Band Saws right away. Write for our colorful booklet.

MOAK MACHINE & TOOL CO.
MOAK
PORT HURON, MICHIGAN



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DISPLAY ADVERTISEMENTS: 1 inch (Minimum), $8.00; 2 inches $16.00; 3 inches (Maximum), $23.00.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, 222 E. Willow Ave., Wheaton, Ill., making known your wants on either new or used machinery and the publisher will gladly assist you.

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STANDARD of COMPARISON
THE "HART" LINE

Largest stock of used machinery in America, many ball-bearing, motorized. Substantial savings. Prompt shipment. Write for our list. We equip plants completely. We also buy complete plants or individual machines.

Earle Hart Woodworking Machine Co.
565 W. Washington Blvd., Chicago 6, Ill.
Phone RAndolph 6-4970

FOR SALE

Victor Peterzell & Co.
1269 Culver Road Rochester 9, N.Y.

Band resaw, 50" Cordesman, 25 h.p.
Belt sander, Mattison, b.b., d.m.d.
Combination Woodworker, 5-in-1 Sidney
Mitre cutter, foot feed, Oliver
Motor, 40 h.p. 3/60/220/440/1200 compl.
Moulder, 10" American No. 35 electric
Nailer, Doig, 6 track, closed back
Planer, Buss 26", d.m.d., single
Planer-matcher, Woods, 14"x6", b.d.
Radial saw, 5 h.p. DeWalt, 3-60-220
Ripsaw, American No. 15, st. line, d.m.d.
Ripsaw, Yates-American No. 21, d.m.d., b.b.
Tenoner, American No. 1, copes, tenons, saw
Large stock h.s.s. knives & resaw blades

FOR SALE

Clifton Machinery Co.
1023 W. 6th St. Cincinnati, Ohio

Saw Dust and Shavings Mill Exhausters and Blowers—Hundreds in stock, sizes to suit any need. Also Air Compressors, Fans, Rotary Blowers, Money Savers—Send Specifications.

All machines rebuilt and fully guaranteed.

FOR SALE

Woodward Machinery Co.
309 E. Second St. Cincinnati 2, Ohio

Band saw, Crescent, 32 in., $175
Borer, Andrews, 12 ft., vert. $600
Cutoff saw, Ransom, under cut, $85
Jointer, Buss 24 in. round head, $185
Jointer, F&E, No. 61, 16 in. rd. head, $185
Planer, Buss, sgl. 27x6 md, $450
Planer, Dennis, 30x6 sgl. cabinet heavy, $450
Planer, Parks, 20x6, pony, $300
Planer & Matcher, Yates, A-4, 15", 4 side rd. hd., want offer.
Butting saw for floorings, F&E, foot power, $100
Ripsaw, F&E 362 st. line, self feed, $550
Surfacer, Amer. 30 in., dbl., No. 49, rd. hd., BB, $1000
Swing cutoff saw, Beloit bb. mtr. on arbor, $175
Variety saw, Crescent, No. 1, $100

FOR SALE

F. H. Graves
Poultney, Vermont

Band saw, Chas. E. Wright, 36"
Chip mortiser, H. B. Smith
Drill press, Moak Machine Co., single spindle
Hollow chisel mortiser, American, with motor attached, 15 hp, 10 hp and 5 hp motors
Mortiser and relisher, Greenlee Bros, with motor att.
Planer, Yates, 30", 2 section feed roll
Tenoner, H. B. Smith, double end, No. 1941 with 15 hp motor and compensator.
All sizes of split pulleys, Shafting & Belting

MACHINERY FOR SALE

WAYNE LUMBER COMPANY
308 Greenpoint Ave. Brooklyn 22, N.Y.

1—righthand Enterprise carriage, complete with dogs, ratchet set works and receder together with wood frame husk, saw guides and spreader; arbor and boxes to go with the outfit.

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S. W. Harrington Inc.

P. O. Box 230 **Asheville, N. C.**

Air Compressors, various sizes
Bandsaw, Amer. 42" pb. bd.
Band saw, New Crescent 20" bb. dmd.
Band saws, Amer. B-36 36" bb. dmd
Band saws, New Moak 36" bb. dmd.
Borer, Amer. 2 spindle radial dmd.
Borer, Root 2 spindle horiz. dmd. style "K"
Boring & sawing, McKnight 26F dmd.
Clamp, Taylor, 40 sect. 4 clamps
Clamp, Taylor 40 sec. 8'6"—5 clamps
Clipper, Coe 88" & motor
Dovetailers, Dodds, 10 & 20 spindle
Dowel Driver & Gluer, Bell No. 8 dmd.
Glue Jointer, Jenkins No. 343A bb. dmd.
Glue jointer, F & E bb. dmd.
Jointers, New Moak 12", bb. dmd.
Lathe, Yates No. 74 bb. dmd.
Mortiser, Sidney, single spindle pb. bd.
Mortiser, Greenlee No. 228 Vert. bd. & motor
Moulder, Amer. 8" sq. hds. pb. bd. & motor
Moulder, Newman No. 20—8" sq. hds. pb. bd.
Planer-Matcher, Yates A1-15"x6" rd. hds. pb. bd.
Planers, New Crescent 24" bb. dmd.
Redrier, Merritt 12 plate 36"x72", d.m.d.
Resaw, Connell & Dengler Circular pd. bd.
Router, Defiance, 2 spindle bb. dmd.
Routers, Carter, floor type Hvy., duty, electric
Sander, Berlin, 31" 3 drum, roll feed bd.
Sander, Ekstrom Carlson No. 18 pneumatic dmd.
Sander, Mattison No. 134, pb. bd.
Sander, Mattison No. 138—Belt, hand, pb. & motor
Sander, New Jefferson, hand block, bb. dmd.
Sander, Smith 49" 3 drum endless bed, bd. with motors
Sanders, F & E 60" 3 drum roll feed, dmd.
Sander, Mattison No. 172 edge belt bb. dmd
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Sanders, Nash No. 25—10 spdle. dmd.
Sanders, Yates-Amer. No. 413—2 drums 49" endless dmd.
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Saws, Powers, gang rip. pb. v-belt & motor
Saws, Buss Tilt table Variety bb. dmd.
Saws, Mattison 207 bb. dmd.
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Porter 43C Str. Line Cut Off Saw, L. or R.
Chicago Riveting Machines, Style No. 90

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12" Tilt arbor, Darro-James
Combination 20th Century Cresson Morris
Taylor Clamp Carrier, 60 Section, 6' 6"
H & A swingsaws No. 5 — No. 25 — No. 55
American single borers DMD
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Grinders—from ¼ HP to 5 HP bench and floor model DMD
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erior 2 Spindle Adjustable Radial, BB, D.M.D.
ong & Miles No. 283B, Sgl. Spdl. Vert., B.B.
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ndy No. 227, 4-way Box Clamp, foot operated.
ndy Mitre Clamp, 20"x26" maximum

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kins No. 3CD, Continuous Chain Feed, B.B., D.M.D.
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American, self-contained
Oliver No. 173 Self-contained, D.M.D.
Superior, Self-contained, motor driven

MORTISERS
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MOULDERS
American No. 1, 4", 4-Side, Motor Driven
Houston, 10", 4-side

PLANERS
Superior 28" Single, Motor Driven
Buss No. 4, 30" sgl. cabinet, M.D.
L. Power 24"x6" Planer-Matcher, motor driven
Yates No. 156, 28", single, motor driven
American No. 112, 30" single, motor driven

ROUTERS
Porter No. 502, 2-spdl., B.B., D.M.D.

SANDERS
43" H.B. Smith, 3-Drum Endless Bed, D.M.D.
American 31", 2-drum, Roll Feed, M.D.
American No. 2, 24" Disc and Oscillating Spdl.
American No. 5 Drum Sander, D.M.D.
Nash No. 4 Round Stock and Dowel Sander

SHAPERS
Onsrud W125 72" Automatic, multiple stations, B.B., direct motor driven, with frequency changer
Buss, Sgl. Spdl., Hi-Speed D.M.D., B.B.

SAWS—CUT-OFF
Buss Double End, Motor Driven
Racine Floor Type—motor driven
Fay & Egan Double End, Motor Driven.

SAWS—RIP
American No. 15 Chain Feed, motor driven
American No. 40 Chain Feed, Ballbearing, D.M.D.
Defiance No. 21-D Chain Feed—motor driven
Yates No. G-2, Chain Feed, D.M.D., B.B.

SAWS—VARIETY
Dodds Tilting Table, Motor Driven
Pettingell, Tilt Arbor, Roller Table, M.D.

TENONERS
American, Single End, Tenon Heads, M.D.
McKnight No. 71C Chair Back Tenoner, M.D.
Towsley Single End, Tenon heads, lower cope, cut off saw, motor driven

VENEER MACHINERY
Dennis Continuous Feed Veneer Jointer, mtr. driven
Jenkins-Falls Veneer Jointer, B.B., motor driven

MISCELLANEOUS
Autonailer, Floor Type, Direct Motor Driven, b.b.
Bell No. 13 Dovetail Gluer.
Black Bros. 12" Edge Glue Spreader, motor driven
Zeller Power Mitre Chopper, motor driven
Fay & Egan No. 253, Automatic Knife Grinder, 30"
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Monk 36" BB M.D.
Yates-American 36" BB M.D.
Crescent 36-in. tilting frame
American 42" V-belt M.D.
Tannewitz 42" M.D.

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Yates No. 312 44" chain-feed hand rip
American 36" Ball Bearing direct M.D.
Buss 36" Bab. Brg. V-belt Motor Dr.
Newman No. 117 circular resaw BB M.D.
McDonough 62" Vertical Band Resaw
Mershon 48" Twin Band Rip B.B.

BORING MACHINES
Rogers Single Spindle Horizontal Borer
New Wysong & Miles, sgle. spdl. vert, d.m.d.
Greenlee No. 356 single-spdl. vert. d.m.d.
Greenlee 36-in. No. 369 vert. gang 8-spd. m.d.
Andrew 4-ft. vert. gang 4 spindles
Root "B-M" 16-spindle, cluster hd., motor dr.

BLOWERS AND FANS
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G. R. No. 50 ball bearing 40 h.p. motor
Sturtevant No. 25-30-35 Mill Exhausters, BB

CLAMPS—GLUE ROOM EQUIPMENT
Taylor 6-ft. 12-sec. wheel type clamp carrier
Black Bros. 10" 30-sec. power feed
Black Bros. No. 2 2D 26-in. dbl. resin sprdr.
Greenlee No. 599 frame and furniture clamp

FILING ROOM MACHINERY
Black Diamond band saw filer
Hanchett band saw brazer
Rogers 38" cup wheel auto. knife grinder
Hanchett No. 608 lap gr. b.d. max. cap 8" wide
Covel-Hanchett No. 325 thin knife grinder

JIG SAWS
Smith-Colladay-Jones Superior M.D.
Porter 6" V-belt motor drive
Mattison Greenlee D-618 continuous feed

JOINTERS
Porter, American, Oliver, Sidney, Fay & Egan from 8" to 30" wide—several have feeding attachments—tell us what you need
Yates and Diehl cont. feed glue jointers, M.D.
Yates No. 213 continuous feed, V-belt m.d.
American No. 1-24" Ball Brg. Motor Drive

LATHES
Mattison No. 55-F 30-in. auto. shaping, M.D.
Whitney 50-in. backknife, gage, lathe
Mattison No. 214 copying lathe
50" Mattison hexagon T-slot heads with carriers and knives 2-11/16" bore
Yates-American T5 Auto. Shaping, M.D.

MORTISERS
Greenlee No. 226 Hollow Chisel, belt drive
New Britain Nos. 2 and 7 chain, motor drive

MOULDERS
Rowley-Hermance 6-in. coupled motor drive
Newman 4"x4" all Electric
Yates No. C-89 10"x4" all Electric
Vennegut 12"x4" with Freq. Changer

PLANERS
Berlin No. 177 30"x12" Double Belt dr.
Yates No. 156 20-9n dr. hd. m.d.
Porter No. 401 24" round head BB D.M.D.
Whitney P-6 36" sq. heads V Belt Mtr. Dr.
Buss 26" 30" & 36" single B.B. M.D.
Buss 36" Single Ball Brg. Motor Dr.

ROUTERS
Carter Type TR-Porter No. 600-Ekstrom-Carlson No. 24-Onsrud Type A4RR Sgl. spindle radial-M.D.

SHAPERS
Whitney No. 134 double-spindle, dir. M.D.
Amer. No. 20 dbl-spdl. dir. M.D. Freq. changer
Sidney double b-b short belted M.D.
Advance double-spindle, ball-bearing, mtr. dr.
American dbl. spindle, belted m.d.
Oliver No. 288T Double Spindle short belted M.D.
Whitney No. 282 Sgl. D.M.D. 56"x40" table
Onsrud W 122 Automatic 40" table

SANDERS
American No. 100 Ball Bearing 43"-3 drum Endless bed with motor
Fay & Egan 30"-drum roll-feed
Yates No. 401 43" 3-drum roll-feed
Duplex moulding sander
Buss-2-spindle vertical, oscillating belt drive
Wysong & Miles No. 164 universal belt, m.d.
Yates No. 421, 49-in. 6-drum with motors

MITRE SAWS
American No. 1 tilt table V Belt M.D.
Union Tilting Arbor direct M.D.
Tannewitz tilt table motor on arbor
Wallace 8" tilting arbor 1 HP 1 ph. motor
Crescent No. 10 roller tilt-table direct m.d.
American Dbl. revolving Arbor 5 HP Belted mtr.

CUT OFF SAWS
Delta No. 20-305 floor type Motor driven
Multiplex A50 adial Arm, 2 HP
Jenkins No. 97, 108"x48" Double End chain feed with copes, direct M.D.
Multiplex No. 40A radial arm, 1½ h.p.
Fay & Egan No. 306 butting saw
Greenlee No. 451 auto. cut-off and dado
Buss double cabinet type, motor-drive
Porter 43 SLA straight line D.M.D.

RIP SAWS
Yates No. 255 Self feed with motor
Yates G77 chain-feed, D.M.D.
Smith No. 335A self-feed, belt or motor-drive
Mattison No. 207 chain-feed, motor-drive

TENONERS
Greenlee 535 Saw Tenoner, dir. M.D.
Greenlee No. 534, Single end with cut-off, no copes, dir. m.d.
Smith No. 225CE Single-end with copes
Houston single-end with copes, rolling table

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BORERS

Single-spindle Fay & Egan No. 1 vertical borer.
Multiple-spindle vertical Fay & Egan borer.
Andrew vertical gang borer.
Andrews Horiz. Multi. Borer mtr. dr. pwr. fd.
American No. 2½ single-spindle horizontal boring machine.

CLAMPS

Black Brothers 40 Section, 6 clamps to the section, power feed, revolving clamp carrier
Handy No. 103 frame clamp.
Taylor revolving clamp carrier, 40-sections.
McKnight 40 section revolving clamp carrier, power feed, 6 clamps to the section
Automatic Edge Gluer with Taylor Panel Flo Glue Spreader
High Point drawer clamp.
New Union Air Operated Revolving Case Clamp
Handy Revolving Case Clamp

DOVETAILERS

One 12-spindle Dodds dovetailer.
Pair 12-spindle Dodds dovetailers: Each equipped with Teague automatic feed for doing fronts, backs and sides. With motors.
Pair 25-spindle Dodds dovetailers with Teague automatic feed.
Wysong & Miles No. 290 Auto. Dovetailer & Lock Corner Machine

FANS

18" double ball bearing shaving exhaust fan
60" ball bearing ventilating fan

GLUE SPREADERS

Practically new Black Bros. 12-in. motor-dr. edge glue spreader.
Francis 72-in. and 84-in. No. 290 plate glue spreader.
New Union conveyorized edge glue spreader for resin glue.

GRINDING ROOM EQUIPMENT

American No. 9 automatic knife grinder.
New Hanchett Automatic Band Saw Grinder for seven inch blades

JOINTERS

Diehl No. 60 direct motor-driven glue jointer.
Practically new Diehl 660 Glue Jointer with return feed conveyor

LATHES

Yates 42-in. No. 74 automatic lathe ball-bearing
Mattison 42-in. No. 57-D with motor.
Practically new Mattison 42" No. 57F motor drive
Large quantity of Mattison lathe hds. and carriers
30" Yates T-5 Automatic Lathe Ball Bearing Motor Drive

MORTISERS

Wysong & Miles No. 288 Multiple Spdle. Mortiser
Wysong & Miles No. 286 hinge seat mortiser.
Practically new Greenlee 6 Spindle No. 212M Direct Motor Drive

MOULDERS

Yates-American 4" C69 Electric Moulder

SINGLE PLANERS

New Crescent P-24 direct motor-drive round-head with grinder.
Oliver Strait-o-plane.
30" Buss Direct Motor Drive ball-bearing single Planer with grinder
30" American No. 444
Used Crescent P-24 Direct Motor Driven

DOUBLE PLANERS

Yates-American 20" No. 177 Ball Bearing Direct Motor Driven Double Planer with Electric Knife Grinder
Whitney 40" No. 24 Direct Motor Driven B.B.
Whitney 30" No. 24 Direct Motor Driven Ball bearing double planer

BAND SAWS

36" J. A. Fay & Co. Band Scroll Saw

SANDERS

Yates-American 61" 823 Roll Feed Direct Motor Driven Ball Bearing Three Drum Sander
Yates-American 43-in. No. 431 3-drum direct m.d. endless-bed.
Mattison No. 124 automatic stroke sander.
American No. 7 oscillating spindle sander.
Fay & Egan direct motor-driven ball-bearing endless-bed.
Pearson waterfall sander.
Nash No. 10 automatic turning sander.
McKnight No. 44 Chair Back Drum Sanders

RESAWS

American No. 4 Band Resaw

CUT-OFF SAWS

Porter C-43 straight-line direct motor-drive.
Newman swing cut-off saw.
Beach ball-bearing roller table double cut-off saw.
Yates-American No. 51 Direct Mtr. Dr. Swing Cut-Off Saw
Yates-American No. 2 direct motor-driven roller table double cut-off saw.

RIP SAWS

Mattison No. 207 direct motor-driven ball-bearing glue joint rip saw.
Yates-American direct motor-driven ball-bearing chain feed rip saw.
Fay & Egan No. 504 direct motor-driven ball-bearing self-feed rip saw.
American No. 15 ball-bearing chain-feed rip saw.

VARIETY SAWS

Crescent direct motor-drive b.b. tilting table.
Beach direct motor-drive ball-bearing tilting-table No. 5A.
Yates F-2 Direct Mtr. Dr. ball bearing

SHAPERS

New Crescent Type S-2 single-spindle with 2-h.p. motor.
Whitney No. 393 automatic single-spindle shaper.
Buss Dble. Spdle. b.b. w/vert. mtrs. belt. to spdls.

TENONERS

Fay & Egan No. 505 Direct Motor Driven Ball Bearing Single End Tenoner

VENEER MACHINERY

76" Francis Hydraulic Veneer Clipper
Dennis veneer taping machine, motor-driven, variable-feed.
Merritt 12-plate veneer re-drier, motor-driven, size 53x100-in.
Diehl No. 60 Veneer Jointer, Direct Motor Drive
Francis Size 96x36 Hydraulic Veneer Press with 100 pairs of clamps and irons.

MISCELLANEOUS

Mitts & Merrill hog with 50-h.p. motor, practically new.
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are the judges. Whether your machines require rebuilding, or you need machinery to help you meet the competitive situations which are ahead, be sure to contact Osborne & Sexton in Columbus. You will find a friendly organization . . . capable and willing to work with you on your engineering and production problems. Write us today.

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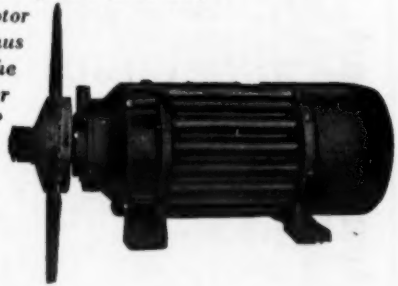

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Band Saw Angling Ship Saw Fay & Egan No. 311 with 20 HP motor new as used price extra blades and parts
Band Saw, 20" Crescent M.D., New
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Band Saw, New Northfield 20" ball bearing
Band Saw, Tannewitz No. P-30 inch, DMD
Boring Machine, American 3 spindle, Horizontal
Boring Machine, Newton 2 spindle horizontal
Boring Machine Oliver Vert. sgl. spdle. D.M.D.
Chucking Machine, Smith, 3 HP motor
Door clamp, J.A. Fay & Co. 8x4'
Glue Spreader, 60" Francis Dbl.
Grinder, Knife, Auto. 30" Fay & Egan No. 253 Disk Wheel
Jointer, 24" Crescent, Belt Drive
Jointer 12" Hall & Brown with motor
Knife Grinder, auto Rogers style F-32"
Lathe, Auto. Berlin with heads, B.D.
Lathe, Propeller Fahlin 10' motor drive with wood patterns and jigs
Lathe, Waymouth, Automatic
Mortiser, Crescent Hollow Chisel, New
Planer, New Powermatic 12x4" M.D.
Planer, single 16x6" Powermatic, New
Planer, single 24x6 Northfield No. 5, New
Planer, Crescent No. P-24-24x8 M.D. New.
Planer, 12x4" Boice Crane No. 1002, New
Radial Saws, New Multiplex, No. 20A-30A & 40A Heads with holders and knives for automatic turning lathe
Radial Saw, Comet Clipper, 3 HP, New
Router & Borer, Radial Arm, Onsrud No. A1
Router, Duro floor model, M.D.
Router, Radial arm No. A1-R with freq. changer
Sander, Crescent 18" Disc, New
Sander, Belt, Auto., Curtis 6'
Sander, Nash auto. belt for Bowling Pins
Sander, Belt 3' Schimmel Reid Semi Auto.
New Delta 10" tilt table Saws
Saw Cut-off Holmes Lighting
Saw, 12" tilt arbor, Dara-James New
Saw Table, American No. 20, Double Arbor
Saw Table, Crescent No. 3, double arbor
Saw, Swing, H. & A. No. 5—10", New
Saw, Swing, H. & A. No. 25—14", New
Saw, Swing, H. & A. No. 55—16", New
Saw, Variety, Hall & Brown No. 131 with motor
Saw, Variety Sidney tilt table
Shaper, American No. 20 with 2—5 HP motors
Shaper, Delta Cabinet Model, New
Tenoner, Hall & Brown No. 51 with copes
Tenoner, Yerkes & Finan Copes and Cut-off

Send us your inquiries for machines not listed

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2—Morgan 16 track open back Nailers, with Clincher
1—Morgan 12 track open back Nailer, with Clincher
3—Morgan 9 track closed back Nailers, with Clincher
1—Connell-Dengler 24" two color Printer
1—Mershon 54" Band Resaw
1—Woods No. 59, 24" Roughing Planer
1—Morgan 2 head corrugated Fastener
2—Morgan Box Board Matchers
B & J No. 1½ Wood Hog
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Greenlee No. 368—30" Mult. Horiz. Borer.
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Andrew 48" & 72" Mult. Horiz. Borer
* Wysong & Miles No. 283-B Vert. Sgl. Spl. Borer.
* Greenlee No. 369—48" Vert. Mult. Borer.
Nash chair seat angular borer.
* McKnight 26F double end sawing and boring machine.

CLAMPING MACHINERY
Taylor 40 Section 78" Revolving Clamp Carrier.
Handy No. 447 Air Operated, 2-Way End Clamp.
Lancaster 100C air-operated 2-way frame clamp.
Bell air-operated frame clamp.

GLUE MIXERS & SPREADERS
Francis M-7 (75 gallons) Veg. Glue Mixer.
Union 36" and 60" Dbl. Roll Resin Glue Spreaders
Phenolite 52" Dbl. Roll Resin Glue Spreader.

JOINTERS
* Moak 16" Hand Jointer, DMD
* Yates-American No. 213 Glue Jointer.
Jenkins No. 3C glue jointer; b-b, v-belt drive.

LATHES
Mattison No. 55-C Auto. Turning Lathe, B.B.
Yates-American No. 74 Auto., turning lathe, b-b.
Ober No. 10 handle lathe.

MORTISERS
* NEW Crescent Vert. Hollow Chisel Mortiser.
* Wysong & Miles No. 284 automatic hollow chisel mortiser.
Greenlee No. 228 Auto. Hollow Chisel Mortiser.
New Britain No. 7 chain saw mortiser.

MOULDERS
* Yates-American Type C-99—10" Electric Moulder.
* Woods No. 132-M—10" Electric Moulder.
Yates C3A-4" BB Belt Drive Moulder.

PLANERS—Facing
* Oliver 36" Straight-O-Plane.
* Porter 20" facing planer—Herzog feed.

PLANERS
* Crescent No. P24—24" single planer.
Yates-B-3 20" single planer.
Whitney No. 24 Double Planer.
* Whitney No. 24—40" Double Planer.
* Whitney No. 33—40" Heavy Duty Dbl. Planer.
Yates-American No. 177-30" heavy duty dbl. planer.
* Yates B-2 36" double planer.
American No. 49—30" roughing planer.

PLANERS & MATCHERS
Triumph 24" Planer, Matcher, Moulder, B.B.
Sherman twin type end matchers.

ROUTERS
Porter No. 612 heavy duty elec. router.
Onsrud W-265 Electric Router.
* Onsrud A4D single arm radial router.

DRUM SANDERS
Yates No. 413 - 31" 2-dr. end. bed mtrzd. sander.
Yates No. 431—31"—43" 3-Dr. End. Bed Mtrzd.
* Solem S-3-M—73" 3-Drum Endless Bed Sander.
Berlin 31" Six Drum Sander.

SANDERS—Belt & Miscellaneous
* Oakley Models E and E-1 semi automatic double belt
Mattison No. 124 Auto. Stroke Sander.
Yates 430 hand block belt sander.
* Ekstrom-Carlson No. 18 Pneumatic drum Sander.
* Oliver 15" Single Disc Sander.
Nash No. 10 & No. 25 Auto. Spindle Sanders.
* Oakley Model H drawer sander.

SAWS—Band Scroll & Resaws
* NEW Crescent 20" Band Scroll Saws.
* American B-36" band saw.
* Tannewitz 42" Band Scroll Saw.
Porter No. 88—18" Band Saw.
Yates (Berlin) No. 283—44" band resaw.

SAWS—Cut-Off
* Porter 43-208 straight line cut-off saw.
* Bell No. 216 straight line cut-off saw.
* Yates-American No. 5 Swing Saw.
* DeWalt Radial Arm Saws—large selection.
* Jenkins No. 105-A Dbl. Cut-Off and Mitre Saws.
* Bell 12B double cut-off saw.

SAWS—Rip
* Yates-American Type G-67 Straight Line Ripsaw.
* Fay & Egan No. 386 Chain Feed Ripsaw.
Yates G-2 Chain Feed Ripsaw, Motorized
Berlin No. 257 self-feed ripsaw.

VARIETY SAWS
NEW Delta Tilting Arbor Variety Saw.
* Yates-American No. 1 Tilt Table Variety Saw.
* Moak No. 16-A Tilt Table Variety Saw.
Baker Double Arbor Variety Saw, BB.

SHAPERS
NEW Crescent No. S-2 Single Spindle Shaper.
Porter No. 103 Single Spindle Shaper, BMD.
Porter No. 201 Double Spindle Shaper, BMD.
* Whitney No. 250 Double Spindle Shaper.
* Whitney No. 134 Double Spindle Shaper.
* Greenlee No. 180 Double Spindle Shaper.
* Whitney No. 351 double spindle shaper, 12½ HP motors
* Whitney No. 393 Automatic Single Spindle Shaper.
* Onsrud No. 124 automatic single spindle shaper.
* Whitney No. 395 automatic double spindle shaper.

TENONERS
H. B. Smith Single End Tenoner.
Fay & Egan No. 2 Single End Tenoner.
Wilkin-Challoner No. 58 Double End Tenoner, BB.
* Wilkin-Challoner No. 60 - 84" double end tenoner.
* Jenkins No. 95—84" double end tenoner.

VENEER EQUIPMENT
Francis 30"x72" and 36"x84" Hyd. Veneer Presses.
Merritt 84x84—8—10—12 Plate Redriers.
Plycor (Fritz) Tapeless Splicer.
Large quantity of 30 and 36" "I" Beams.

MISCELLANEOUS MACHINES
NEW Hanchett No. 133 Auto. Band Resaw Sharpener
Hanchett No. 928 Auto. Circular Saw Sharpener.
Wysong & Miles No. 290 Auto. Dovetailer.
Sheboygan No. 130 saddle seat machine.
Dauber-Bell dowel cutter and pointer.

This is only a partial list. If the machine you want is not shown, write us.

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THE "HART" LINE

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SCOTCH PRICES

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Boxboard Matcher, Morgan
Clamps, Handy No. 35 2-way; Handy No. 195, mitre.
Dovetailer, Dodds 15-spindle
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Abrasives, 13, 127
Abrasive Renewing Compound, 118
Adhesives, 6-7, 9, 14-15, 23, 29, 58, 62-63, 65, 67, 71, 184

Band Saw Tires & Wheels, 195
Bits, 117, 163
Bits, machine, 191
Blowers, 111
Bolt Drivers, 196
Box Printing Machinery, 51

Clamps, 100, 116, 145, 185, 199
Clamps, piling, 100, 145
Clamps, toggle 100, 104, 145
Conveyors, 229
Cutter Head Knives, 192
Cutter Heads, 33, 38-39, 55, 99, 115, 199

Dowel Machinery, 49
Dowels, 198
Dry Kiln Services, 201
Dry Kilns, 25
Dust Control Systems, 41, 86, 178

Edge Gluing Machinery, 10-11, 155
Electronic Bonding Equipment, 134-135, 155
Enamel, 106, 113

Factory Trucks, 185, 188, 193, 195, 197
Fasteners, 80, 83, 105, 144 194
Finishes, 106, 113

Glue Pots, 190
Glue Spreaders, Front Cover
Glues, Casein, 29
Glues, resinous, 6-7, 9, 14-15, 58, 62-63, 65
Glues, resorcinal, 23, 67
Grinders 93, 97, 147, Back Cover

Humidifying Equipment, 103

Instruction, 69

Jointers, 18-19, 79, 227

Knives, 8, 38-39, 55, 91, 109, 182

Lacquers, 106, 113
Lathes, 84, Back Cover
Lubricators & Lubricating Systems, 12, 148, 175
Lumber, 88, 173, 174, 179
Lumber Lifts, 72

Materials Handling Equipment, 72, 229
Moisture Meters, 68, 93, 128, 183
Molders, 186
Mortise Chains, 192

Nailing Machines, 42, 51

Paint, 106, 113
Planers, 57, 77, 79, 85
Planes, 142
Plywood, 150, 157, 177, 179
Plywood, molded, 159, 168, 191
Plywood Presses, 162, 167

Resaws, band, 188, 231
Resins, 65
Routers, 138, 180

Saddle Seat Machine, 53
Sanders, automatic stroke, 232, Back Cover
Sanders, belt, 1
Sanders, contour, 71, 132, 195
Sanders, portable, 30, 146
Sash Pinner, Inside Back Cover
Saw Blades, band, 120-121, 193, 198, 231
Saw Blades, carbide, 94, 119, 161
Saw Blades circular, 2, 20-21, 120-121, 133, 231
Saw Gauges, 201
Saw Guides, 189
Saw Setting Machines, 34
Saw Sharpeners, 86, 137, 141
Saws, band, 18-19, 31, 205
Saws, cut-off, 4, 28
Saws, miter, 26-27
Saws, portable, 129
Saws, radial, 18-19, 31, 130
Saws, rip, 16, 22, 97, 99, Back Cover
Saws, variety, 122, 123, 203
Screws, 83, 105, 144, 194
Shaper Collars, 190
Shapers, 79
Shutter Grooving Machinery, 102
Slides, table, 87
Stains, 106, 113
Staples, 82
Stapling Machines, 82, Inside Back Cover
Steel Strapping, 32
Surfacers, 3, 17, 124

Tac Rags, 196
Tenoners, 36

Upholstery Materials, 170

Varnish, 106, 113
Veneer Clippers, 169
Veneer Dryers, 169
Veneer Jointers, 16, 164
Veneer Lathes, 169
Veneer Splicers, 16
Veneer Tables, 179
Veneers, 160, 172, 173, 174, 176, 179

Washers, 195
Water Heaters, 197
Woodworking Machinery, all kinds, 78, 120-121

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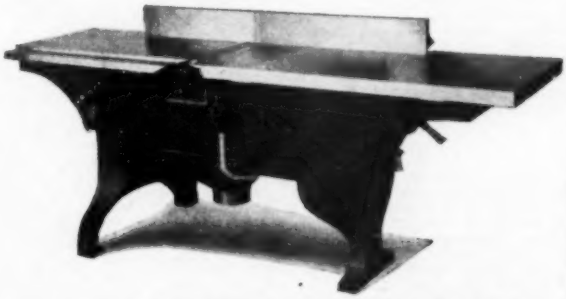

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Index to Advertisers

A

A.A.A. Saw & Tool Service & Supply Co. 208-211
Abrasive Products, Inc. 127
Acme Steel Company 32
Adhesive Products Corp. 184
Adjustable Clamp Co. 199
Aetna Plywood & Veneer Co. 150-160
Aget-Detroit Company 86
Alamo Manufacturers Association 208-212
American Cyanamid Company 14-15
American Machinery Exchange 208
American Machinery & Motor Co. 214
American Saw Mill Machinery Company 31
American Screw Company 83
American Varnish Company 113
Amos-Thompson Corp. 174
Armour and Company 13
Armstrong Machine Works 103
Associated Plywood Mills, Inc. 157
Atlantic Lumber Company 88
Atlas Press Company 24

B

Bailey and Sons, Inc., S. J. 211
Bakelite Division (Union Carbide and Carbon Corp.) 6-7
Bass, Rudolf 78
Beach Manufacturing Company 4
Bell Machine Company 49
Benedict Manufacturing Company 147
Berthelsen Engineering Works 162
Bickler, Edgar G. 222
Big Four Carbide Tool Company 2
Bijur Lubricating Corp. 175
Birds Eye Veneer Company 172
Black Bros. Co., Inc. ..... Inside Front Cover
Blake & Johnson Company 83
Boice-Crane Co. 79
Borden Company 62-63
Boshco, Inc. 208
Branyan and Peterson, Inc. 212
Breuer Electric Manufacturing Company 111
Burroughs-Ross-Colville Company 198
Burton Saw Company 193
Buss Machine Works 124

C

Cardinal Company 211
Carter Products Company 195
Cincinnati Tool Company 116
Click, Mrs A. Graham (Veneer Tables) 179
Clifton Machinery Company 206
Coe Manufacturing Company 169
Consolidated Machinery & Supply Company, Ltd. 130
Continental Screw Company 83-105

D

Deacon Plywood Company, J. C. 177
DeLuxe Saw & Tool Company 119
Delmhorst Instrument Company 128
Delta Power Tool Div. (Rockwell Mfg. Co.) 18-19
Dependable Machine Company 97
Detro Manufacturing & Sales Company 196
Detroit Edge Tool Company 91
Detroit Stamping Company 104
Detroit Surfacing Machine Company 146
DeWalt, Inc. 122-123
Diehl Machine Works, Inc., G.M. 16-99
Disston and Sons, Inc., Henry 33
Doig, Inc., Wm. S. 42

E

Ekstrom, Carlson & Company 138
Electric Equipment Company 211
Ervin Machinery Company 213

F

Fader & Co., A. L. 215
Federal Adhesives Corp. 58
Festo Special Woodworking Machines 102
Field Co., Wm. H. 192
Foley Manufacturing Company 141
Francis Company, Charles E. 167

G

Garson Company, M. 202-212
Gaynes Engineering Company 222
Gehon Furniture Company 212
Gits Brothers Mfg. Company 148
Globe Vise and Truck Company 197
Goodspeed Machine Company 84
Graves, F. H. 206
Green Machinery Company 225
Greenlee Bros. and Company 36
Greenlee Tool Co. (Div. Greenlee Bros. & Co.) 163
Gustafson & Scott Manufacturing Company 190-195-223

H

Hackett Co., J. Lee 209-216-224
Hamilton Caster & Manufacturing Co. 195
Hanchett Manufacturing Company 34
Harrington, Inc., S. W. 207
Hart Woodworking Machine Co. Earle 155-206-221
Hartford Clamp Company 185
Haskew & Company, R. K. 209
Heinemann Saw and Mfg. Company, F. 133
Hill Brothers Veneer Company 176

I

Imrie Dry Kiln Company 201

J

Jakes Foundry Company 188
Joa, Curt (Jenkins Machinery Co.) 209
Jones & Orth Cutter Head Company 115

K

Kenner, L. R. 207
Keystone Machinery Company 212
Klok Institute 69
Koppers Company, Inc. 23
Krieg, Victor J. (Lesto Hand Saws) 129

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Name _____ Firm _____

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L

Lafayette Saw and Knife Company 94
Lakeshore Machinery Company 225
Laminated Veneers, Inc. 159
Land, Inc., L. J. 212
Larson Plywood Company 168
Leitelt Iron Works 72
Lesto Hand Saws
(Victor J. Krieg) 129
Lundberg, David V 208

M

McDonald Machinery Company 220
McDonough Mfg. Company 188
McKnight Machinery Company 53
Marcoloy, Inc. 161
Marks Woodworking Machinery Co. 208
Mattison Machine Works ..... Back Cover
Media Machine Works 203
Mereen-Johnson Machine Company 28
Merit Products, Inc. 132
Mill Supply Company 207
Moak Machine and Tool Company 205
Moisture Register Company 183
Moline Paint Manufacturing Company 118
Monical Machinery Company 208
Moore, J. W. 208-209
Moore Dry Kiln Company 68
Mummert-Dixon Company 93
Muskegon Machine Company 211
Myers Truck and Caster Company 185

N

National Air Sander, Inc. 30
National Casein Company 29
National Screw & Mfg. Co. 83
Nelson Company 70
New Process Screw Corp. 83
Newman Machine Company 77
Norgren Company, C. A. 12
Northern Hardwood Veneers, Inc. 179
Northfield Foundry & Machine Company 227

O

Ohio Knife Company 109
O'Leary & Flynn 224
Oliver Machinery Company 1
Olsen Tool and Equipment Company 123
Osborne & Sexton Machinery Co. 209-218-219

P

P T I Inc. 20-21
Paddock Tool Company 189
Parks Woodworking Machine Co., The 57
Perkins Glue Company 67
Peterzell and Company, Victor 206
Pheoll Manufacturing Company 144
Plycor Company 155
Porter Machinery Company, C. O. 3
Porter-Cable Machinery Company 180
Power and Company, L. 85
Price and Rutzebeck 191
Providence Saw and Knife Company 86

R

Reed, Victor J. 208
Reliance Varnish Company 106
Rivco, Inc. 83
Rockford Screw Products Company 194
Rohm and Haas Co. 9
Root Company, B. M. 224

S

St. Joe Machines, Inc. 82
Sand-Rite Manufacturing Company 71
Sargent and Company 142
Saw & Knife Specialty Company, Inc. 198
Shimer & Sons, Samuel J 199
Simonds Saw and Steel Company 231
Sinker-Davis Company 22
Smithway Machine Company 186
Sorenson and Peters 191
South Chester Corp. 80
Southington Hardware Mfg. Co. 83-123
Sponge Rubber Products Company 170
Spotnails, Inc. ..... Inside Back Cover
Stalter Edge Tool Company 182
Standard Dry Kiln Company 25-92
Stanley Works 101
Stem, Inc., Chester B. 173
Sterling Cutter and Manufacturing Co. 192
Stowell Screw Co., Ltd. 83
Supreme Woodworking Machinery Co. 223
Surplus and Salvage Company, Inc. 209
Sutton Woodworking Machine Company 217
Synvar Corp. 65

T

Tannewitz Works 26-27-200
Taylor Manufacturing Co., James L. 10-11-100
Titan Tool Company 196
Torit Manufacturing Company 41
Towsley Trucks, Inc. 193

U

Union Carbide and Carbon Corp.
(Bakelite Division) 6-7
Used and Rebuilt Machinery 206

V

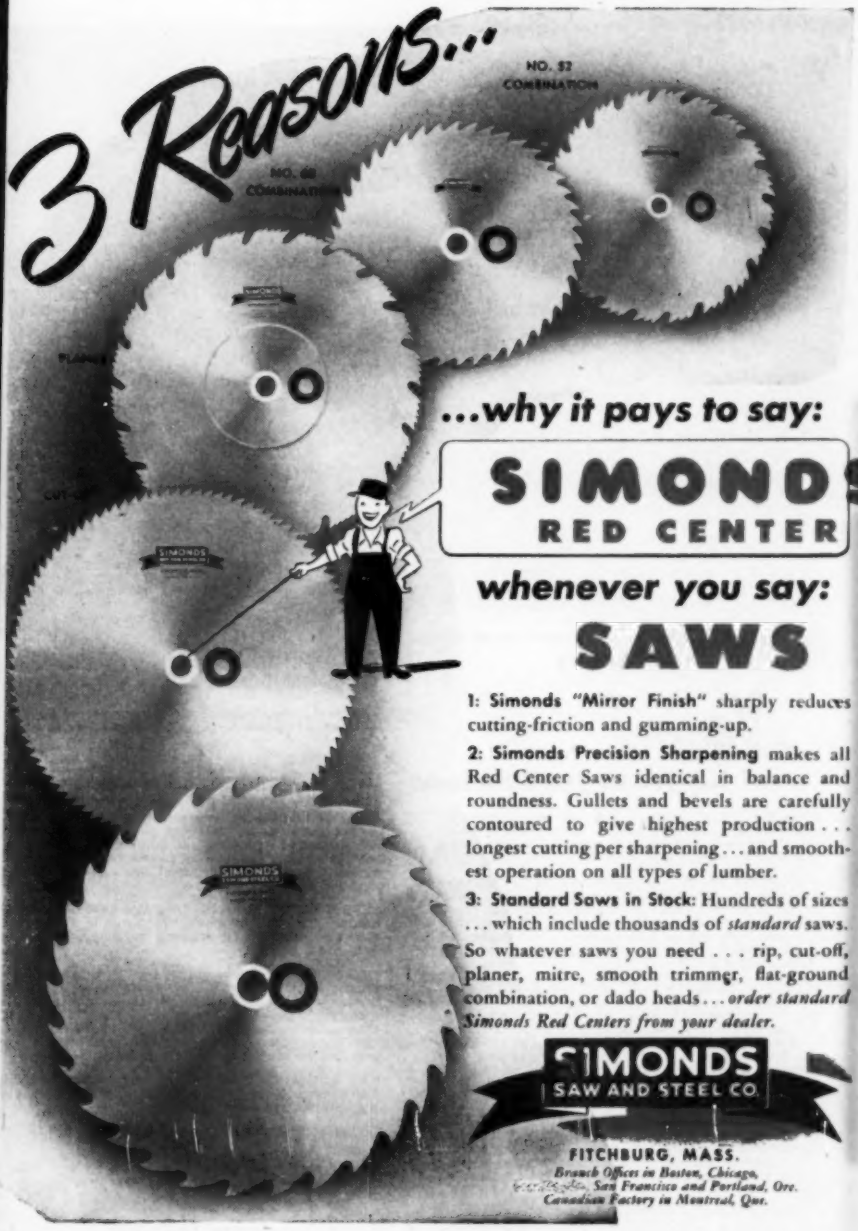
Veneer Machinery Company 164
Vulcan Electric Company 197

W

Walter and Company, Inc., B. 87
Walters Manufacturing Company 229
Wapakoneta Machine Company 8
Wardwell Manufacturing Company 137
Wayne Lumber Company 206
Weisner and Company, Joseph 220
Westinghouse Electric Corp. 134-135
Wetzler Clamp Company 145
Whitman and Barnes 117
Whitney and Son, Inc., Baxter D. 17
Wiegand Corp., Henry 51
Wisconsin Knife Works 55
Woodward Machinery Company 206
Woodworkers Tool Works 120-121-207
Wrought Washer Mfg. Company 195
Wysong and Miles Company 232

Y

Yates-American Machine Company 38-39
Young and Bertke Company 178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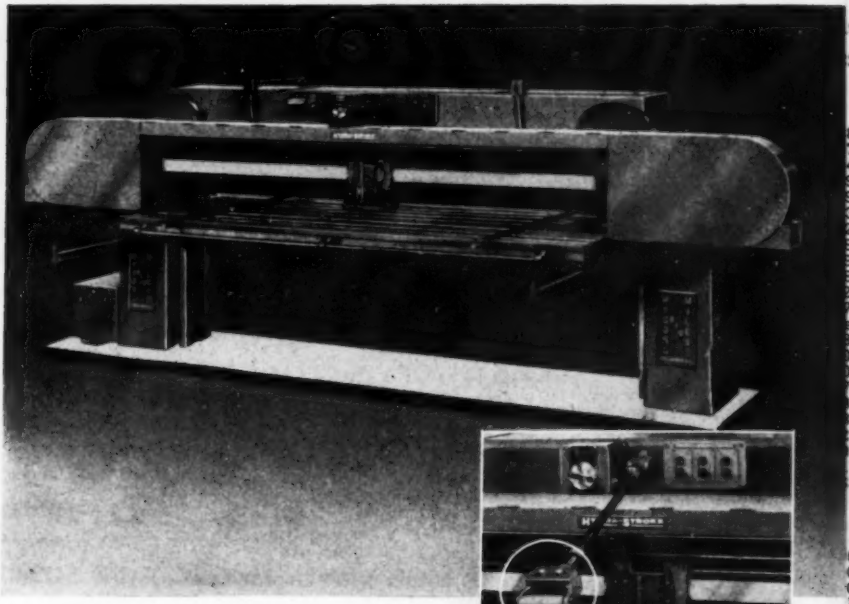

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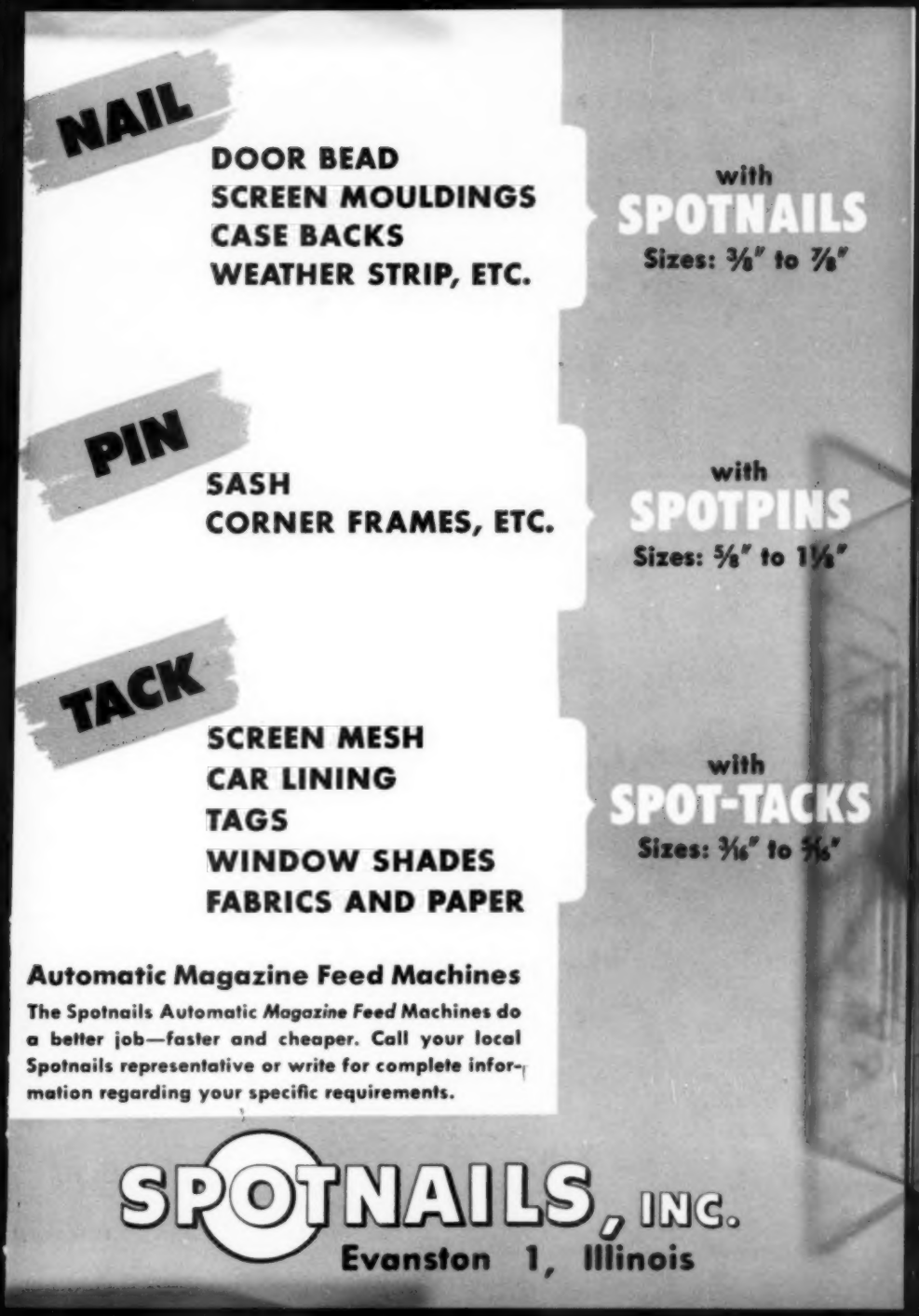
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